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ABSTRACT

A group of nine elementary school children, each referred originally by his/her teacher due to low levels of peer interaction in free-play situations at school, participated in a study designed to assess the effects of treatment "booster shots" on the maintenance of social behavior. Five of the children had been treated previously for social withdrawal; the other four had not. An intervention package, consisting of social skills tutoring and a recess-based point system, was alternated with treatment reversal periods to determine whether maintenance effects would accumulate with repeated exposure to treatment procedures. Observational data collected during playground recess periods showed that four of the five previously treated subjects were interacting within normative levels of social behavior following a series of three treatment "booster shots." Only one of the four previously untreated subjects showed evidence of a similar effect. Results indicate that a treatment "booster shot" strategy might provide an effective means of facilitating maintenance of interactive behavior for children previously treated for social withdrawal. (Author)

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THE EFFECTS OF REPEATED TREATMENT
ON THE MAINTENANCE OF SOCIAL BEHAVIOR

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ABSTRACT

Nine elementary school children, each referred originally by his/her teacher due to low levels of peer interaction in free-play situations at school, participated in a study designed to assess the effects of treatment "booster shots" on the maintenance of social behavior. Five of these children previously had been involved in the Procedures for Establishing Effective Relationship Skills (PEERS) Program developed by the Center at Oregon for Research in the Behavioral Education of the Handicapped (CORBEH). None of the remaining four children had a previous history of treatment for social withdrawal. An intervention package, consisting of social skills tutoring and a recess-based point system, was alternated with treatment reversal periods to determine whether maintenance effects would accumulate with repeated exposure to treatment procedures. Observational data collected during playground recess periods showed that four of the five previously treated subjects were interacting within normative levels of social behavior following a series of three treatment "booster shots." In general, these data were significantly higher than initial baseline data (as indicated by Mann-Whitney U tests) and appeared to be stable during final maintenance evaluations. Only one of the four previously untreated subjects showed evidence of a similar effect. Verbal behavior did not appear to be responsive to the treatment procedures. Teacher and parent ratings of child social behavior showed general improvement for both treated and untreated subjects between pre- and post-treatment assessments to rating levels approaching those of their non-withdrawn peers. Peer sociometric ratings also showed increases from pre- to post-treatment phases for both groups of subjects. It appears from these results that a treatment "booster shot" strategy might provide an effective means of facilitating maintenance of interactive behavior for children previously treated for social withdrawal. These findings are discussed in terms of social entrapment, as presented by Baer and Wolf (1970), and in terms of social validation, as presented by Kazdin (1977).

INTRODUCTION AND LITERATURE REVIEW

The consequences later in life of social isolation/withdrawal in childhood can be serious. Several researchers have found positive relationships between social status among peers in childhood and societal adjustment in adolescence and adulthood. According to Lippit and Gold (1959), children whose social status is low among classroom peers at school tend to have more mental health problems than do high-status children. These problems reportedly are reflected in their interpersonal relationships both in school and at home. Roff (1961) and Roff, Sells, and Golden (1972) described relationships between personality problems in childhood and undesireable conduct in adolescence and adulthood. Seemingly, children who display personality problems early in life exhibit more conduct problems during their adolescent and adult years than do individuals who show good childhood adjustment. Similarly, persons whose social adjustments were vulnerable as children were found to be disproportionately represented in a community-wide register of psychiatric cases as young adults (Cowen, Pederson, Babigian, Izzo, and Trost, 1973). The authors presented extensive follow-up data ranging from 11 to 13 years to support this conclusion.

Amidon (1961) and Amidon and Hoffman (1965) asserted that teachers can be trained to analyze the social structure in their classrooms, to identify students who are socially rejected and/or isolated, and subsequently to structure improvement in social status for these students.

Recent volumes of professional publications reflect increased research and clinical interests in the problems of socially isolated/withdrawn children. However, many problems related to social interaction in children have not been resolved as yet. These include the repeated demonstrations that: (1) a given, technological set of procedures can be used effectively to increase the peer involvement of low interacting children; (2) these procedures can be validated using multiple measures of behavior change, including direct observation, peer sociometrics, and teacher and parent ratings; and (3) such behavior change can be maintained once the procedures used to increase the behavior have been terminated.

A great deal already is known about reliably producing initial intervention effects, and development of that aspect of our technology should be continued. But relatively little is known about ensuring the endurance of these effects once treatment is withdrawn or terminated. Efforts directed toward that end must be started now.

If problems of behavior are to be solved permanently, rather than merely reduced temporarily, improvement which is brought about must endure over time. However, "that generality is not automatically accomplished whenever behavior is changed....needs occasional emphasis....In general, generalization should be programmed, rather than expected or lamented" (Baer, Wolf, and Risley, 1968, p. 96). This testimony, together with the reports of many other authors (Conway and Bucher, 1976; Kazdin and Bootzin, 1972; Marholin II, Siegel, and Phillips, 1976; O'Leary and Drabman, 1971) characterizes naturally occurring maintenance as a greatly desireable but highly elusive effect.

The primary purpose of the present investigation was to chase this elusive effect -- to provide evidence relating to the issue of whether changes in children's social behavior can be maintained over time. An attempt was made to program the maintenance of intervention effects which had been achieved through the implementation of PEERS (Procedures for Establishing Effective Relationship Skills), a packaged program for the remediation of social withdrawal. This was done by scheduling intervention phases in a repeated treatment fashion across days for nine elementary school children with low levels of peer involvement in social situations. A secondary focus of the study was to provide additional replications of the packaged program's effectiveness, and to do so using multiple dependent measures.

The literature review which follows contains two major parts. The first part deals with previous efforts to increase the peer involvement of low interacting children in school-related settings and with naturally occurring maintenance effects reported in those studies. The second part covers research efforts which have been made to program the maintenance of previously modified behavior. In order to increase the number of studies available for review in an otherwise little-researched area, discussion in the second part of the review will not be limited to the maintenance of social interaction. Rather, it will include the programmed maintenance of other important school-related behaviors as well.

Remediation of Social Isolation/Withdrawal in School-Related Settings

Ranging over the past fifteen years, several approaches have been investigated for their effectiveness in increasing the sociometric status and/or peer interaction of socially isolated/withdrawn children in pre-school and elementary school settings. At the most general level, these efforts can be classified as: (1) primarily antecedent interventions, (2) primarily consequent interventions, or (3) a combination of antecedent and consequent interventions. This distinction depends on whether the primary stimulus manipulations occurred prior to the child's social behavior, subsequent to the behavior, or whether the intervention contained both antecedent and consequent major components. In a technical sense, all interventions contain both antecedent and consequent components, but not all of these are programmed; some which occur naturally are not considered primary intervention components. Thus, even though the distinction made here is somewhat arbitrary, it will be used because of its usefulness in classifying interventions for review purposes.

Antecedent Interventions

Antecedent interventions have been of two basic varieties -- those employing symbolic modeling alone and those controlling setting events (peer pairing, structured play, provision of play equipment) which could affect social interactions.

Symbolic Modeling

Symbolic modeling procedures, the use of filmed demonstrations of appropriate social interaction, have been used successfully to increase the frequency of peer interaction in socially isolated/withdrawn children. In particular, the use of a film developed, described and evaluated by O'Connor (1969) has been the most widely reported. The O'Connor film, which runs 23 minutes and which includes an adult narration, presents a series of eleven child-child interactions. Each interaction begins by showing a child at the fringes of a group and concludes with the child becoming positively involved in the group. As the series progresses, the interactions depicted become increasingly more complex. As a child in the film becomes involved with other children in each new scene, the accompanying narration provides an account of the situation and induces children watching the film to interact with their peers in similar situations. Typically, the film is evaluated by comparing its effects to those of a film of equivalent length depicting something other than interactions between young children. A group of six isolated pre-school children who were shown this film increased their peer interaction in a subsequent free-play setting, surpassing the normative level for such behavior, while a group of seven children who viewed a control film showed no change. Data pertaining to the maintenance of this increased social behavior were not reported (O'Connor, 1969).

Evers-Pasquale and Sherman (1975) also found that the O'Connor film produced more social interaction (playing, talking, touching, smiling) with isolated pre-school children than did a control film. These effects were more pronounced with peer-oriented than with non-peer-oriented isolates, but even the latter group's performance was superior to that of the group viewing a control film. Follow-up evaluations conducted at one and four months after post-treatment assessment revealed that the increases in social behavior produced by the film persisted.

However, few of the original subjects were available for the second follow-up phase, and these maintenance results thus must be considered tentative.

Using their own materials, consisting of four 5-minute videotapes depicting various social skills, Keller and Carlson (1974) found that symbolic modeling produced increased frequencies of social interaction, of dispensing social reinforcement, and of receiving social reinforcement by ten isolated pre-school children. Nine children comprising a control group and viewing four 5-minute control sequences showed no changes in these measures. A three week follow-up assessment revealed that although some experimental subjects continued to evidence increased levels of social interaction, experimental and control groups were not significantly different from one another on interaction measures.

The findings reported above regarding the effects of symbolic modeling are not without contradiction. Walker, Hops, Greenwood, and Todd (Note 1) reported that the O'Connor (1969) film had no effect on the interaction of six withdrawn children in a public school experimental classroom. Subsequent consequent interventions, however, in the form of both individual and group contingencies, proved to be effective in establishing peer involvement for the children. Similarly, Gottman (1977) found no effects on either interaction frequency or sociometric status of 16 low interacting children in a Head Start program who viewed a film about initiating entry into peer groups.

Several variables can be posited as being responsible for the disparate findings on symbolic modeling. The Walker, et.al. subjects were older than the children who previously had shown increased responding as a result of symbolic modeling. Further, they were classified as withdrawn, rather than isolated -- a distinction which Gottman (in press) states is critical in understanding children's social interaction. Gottman's (1977) subjects were of the same age group and classification as subjects involved in effective demonstrations of symbolic modeling, but they viewed a different film. Films other than that of O'Connor (1969) have been shown to produce positive effects (i.e., that of Keller and Carlson, 1974), but it is not likely that every film designed to increase children's interactions actually will be functional in doing so. The effects attributed to symbolic modeling also will be determined in part by the setting events present in the children's on-going social environment and by the extent to which children are able to gain entry into the naturally occurring system of reinforcement operating in that environment (Baer and Wolf, 1970). There may be other variables which could explain the divergent findings of symbolic modeling research. If so, they are not immediately obvious. Two of the studies reported above included follow-up procedures (Evers-Pasquale and Sherman, 1975; Keller and Carlson, 1974). Neither, though, obtained unqualified maintenance effects. It is clear that additional research into the variables and parameters which make symbolic modeling effective, including maintenance-facilitating factors, should be undertaken. The efficiency of the procedure, when effective, certainly merits such investigation.

Control of Setting Events

Some attempts to increase the interaction of isolated/withdrawn children have consisted solely of manipulations of setting events in children's social environments at school. Primarily, these efforts have involved peer pairing, structured interaction, provision of materials to facilitate interaction, or a combination of these approaches. Peer pairing consists merely of assigning two or more children to interact with one another. If a low interacting child and a normally interacting child are assigned to interact, it is possible that the latter will be able to engage the former in some degree of interaction. Structured interaction involves assigning a specific social activity to two or more children. The activity can be either a work or a play task. Assignments usually include a peer pairing component, although children might be required to find their own partners. Frequently, the children are furnished with toys or other materials designed to facilitate their interaction. In each of these cases, it is assumed that the structure imposed by the peer pairing, the assigned activity, or the materials provided will be sufficient to trigger interaction between two or more children, and that once triggered, the interaction will be maintained by the continued presence of the setting structure and by the natural community of reinforcement which begins to flow between the children (Baer and Wolf, 1970).

An example of the peer pairing procedure with ten socially isolated preschool children has been provided by Adamsky (Note 2). By pairing isolated subjects with socially reinforcing non-isolated peers in dyadic play situations, Adamsky obtained increases in the isolated children's parallel and cooperative play and in their talking with the peers. Informal observations at three months and teacher reports at one year following treatment indicated that intervention effects persisted across time.

Strain and his colleagues (Strain and Abraham, Note 3; Strain, Shores, and Timm, 1977) conducted a series of studies using the peer pairing procedure with low interacting preschool children. These studies made use of socially skilled peer-confederates who were instructed to make positive initiations to the low interacting children in an attempt to engage them in reciprocal interaction. This paradigm was immediately effective in increasing frequencies of subjects' positive social interactions above baseline levels. Further, five out of the six subjects in one study (Strain, et.al., 1977) also increased their initiations to the peer-confederates, even though this was not programmed. However, the intervention effects found in this work did not maintain during brief treatment reversal phases.

Lilly (1971) used peer pairing procedures similar to those described above to increase the social acceptance of low achieving, low sociometric status children in upper elementary public school classes. Subjects were paired with popular students in their rooms to work on class projects and subsequently made initial gains in social acceptance. Nevertheless, these gains did not maintain, as evidenced by a six week follow-up assessment.

At least two studies have attempted to increase social acceptance of mentally retarded students through peer pairing (Chennault, 1967; Rucker and Vincenzo, 1970). Both employed organized cooperative group activities in which low acceptance students were paired with popular peers, and both found greater gains in acceptance at post-treatment for experimental than for control children. However, one month after the post-treatment assessment, experimental-control group differences reported by Rucker and Vincenzo had disappeared.

Structured interaction procedures specify the activity which the paired children are to engage in, while peer pairing procedures do not. Several authors have investigated the effects of structured interaction on children's social behavior. Johnson, Goetz, Baer, and Green (Note 4) reported that structured interaction, in the form of a cooperative game played in a laboratory setting between a low interacting pre-school girl and a classmate, resulted in increased cooperative play between the girl and her peers in a classroom free-time setting. During a nine-day treatment reversal phase, the child's cooperative behavior in the classroom continued near intervention levels. The findings of Johnson, et.al. are particularly interesting since the child's classroom cooperative play represents a generalized effect from the laboratory intervention.

The procedure described by Johnson, et.al. (Note 4) has been adapted and incorporated into a set of packaged procedures for treating withdrawn children in the regular elementary school setting (Hops, Fleischman, Guild, Paine, Walker, and Greenwood, Note 5). This adapted technique, called a joint task procedure, involves pairing a withdrawn child with a socially interactive classmate and assigning the children to engage in a specified classroom activity which requires talking and turn-taking. A list of activities and a description of procedures which teachers can use in implementing the technique is provided in the package. Hops, et.al. evaluated the joint task procedure, both singly and as part of the larger intervention package, and found it to produce immediate and substantial increases in social behavior for all withdrawn children to whom it was applied. Evidence regarding carry-over of increased social behavior to immediately subsequent classroom free-time sessions also was reported for several children. However, data pertaining to the maintenance of effects produced by this procedure are not available.

Clearly, when low interacting children are paired with normally interacting peers, the activities they become engaged in and the materials they become involved with will in large part determine the amount of interaction which subsequently takes place when adult supervision is removed. Accordingly, at least two studies have been carried out to evaluate a variety of activities and materials which might be employed in conjunction with peer pairing arrangements (Bonney, 1971; Quilitch and Risley, 1973). The former evaluated the effects of 17 socializing experiences on the sociometric status of low acceptance children in grades three through six. Although no significant differences appeared between any of the activities, some children made substantial gains from some of the events. The second study examined the effects of a variety of toys, classified as either social or isolate, on the interactive play behavior of normal 7-year-old children in an urban recreational setting. Social play occurred only 16% of the time when isolate toys were provided, but 78% of the time when given social toys. Thus, the roles of activities and materials in peer pairing paradigms seem to be critical.

It appears that the control of setting events can be a highly useful strategy for increasing both social acceptance and interaction frequencies, especially when attention is given by teachers to (1) the activities and materials provided for the children and (2) the reciprocity among the children during the time that peer pairing is in effect.

Yet, setting event interventions would not appear to be as powerful as those comprised of consequent events, and any maintenance effects achieved through the control of setting events may be short-lived. This proposal has led at least two authors (Lilly, 1971; Rucker and Vincenzo, 1970) to argue for implementation of antecedent interventions on a longer term and/or more continuous basis. One alternative to this suggestion is to fade the potency and schedule of the initial intervention to the point where the child's behavior is under the control of naturally occurring stimulus in his/her environment. A second alternative is to start with a more powerful consequent intervention initially.

Consequent Interventions

Consequent interventions for the remediation of low levels of social interaction in young children have been of two primary classifications--those employing basic reinforcement procedures only, and those involving more complex token reinforcement systems.

Basic Reinforcement Procedures

Basic reinforcement procedures used to increase the social behavior of low interacting children have included food, physical contact, and adult praise. The latter of these has been the most extensively evaluated.

Allen, Hart, Buell, Harris, and Wolf (1964) used teacher attention to increase the peer involvement of a low interacting pre-school girl. The authors then systematically leaned the schedule of teacher praise to produce durability of the effects as indicated by post-checks ranging up to four weeks beyond the termination of treatment. This study was one of the first experiments to demonstrate that an inexpensive and simple procedure, adult attention, could be used to increase social interaction in children. Many similar studies subsequently followed. Hart, Reynolds, Baer, Brawley, and Harris (1968) validated the requirement that in order to be effective in altering children's social behavior, attention had to be contingent on the child's behavior. Attention which was not contingent was ineffective in altering social interaction. No report was made of the maintenance of treatment effects in this study. More recently, Strain and Wiegerink (1975) reported that teacher attention provided an effective intervention for the social play of two behavior disordered boys in a pre-school experimental classroom. During a brief treatment reversal period, the boys' social behavior, which increased markedly during intervention, fell off sharply, revealing the non-durability of the initial effect. Demonstrations of the effectiveness of adult attention on child social behavior continue today, more than a decade after the first such study was conducted, and important advances continue to occur. One substantial contribution to our understanding of child social behavior recently was made by Warren, Rogers-Warren, and Baer (1976). Initially, food and adult praise were provided to nine pre-school children for offering to share with one another. Share offers increased, but the percent of offers accepted decreased. By regulating the offer rates of a child, however, the investigators increased the acceptance rates by other children of the child's offers. No report was made of the maintenance of this effect. Thus, controlling the rate of a social behavior may influence the way in which other people respond to it. This finding is important because it challenges the assumption that more social behavior necessarily is better. Instead, we should assume, perhaps, that moderation in social interaction, as defined by normative levels (Walker and Hops, 1976), is better than either social excesses or social deficits.

In summary, the findings regarding adult attention to child social behavior generally are unequivocal, and the effectiveness of the procedure is well established. We should turn our attention now to the problems of producing appropriate levels of social behavior (Warren, Rogers-Warren, and Baer, 1976) and increasing the durability of such responding (Baer and Wolf, 1970).

Some variations of the adult attention procedure also have been reported. One such modification has been the use of indirect contingencies to alter child social behavior. Buell, Stoddard, Harris, and Baer (1968) applied teacher social reinforcement to the use of outdoor play equipment by a pre-school girl with motor and social deficits. The contingency produced an increase in the child's use of the equipment and collaterally led to a increase in her social interaction with other children. The extent to which these behaviors maintained at their increased levels after removal of adult attention was not reported. Strain and Timm (1974) found that praise and physical contact directed to either a behaviorally disordered pre-school child or to his peers increased the interaction of both parties. As one might expect, the party receiving the contingency did more initiating than the other, but it is interesting to note that the reciprocal nature of the social interaction facilitated the interaction of the non-reinforced party as well, whether that party was the subject or the peers. These effects were lost, however, during a seven-day treatment reversal period. In a combined direct and indirect contingency, Pinkston, Reese, LeBlanc, and Baer (1973) used adult attention to other children -- to the victims of physical attacks -- to reduce the fighting of an overly aggressive pre-school boy. Once his level of fighting had been reduced, the boy received teacher attention for increased positive social interaction with his peers. A follow-up assessment revealed that the boy was continuing to interact positively with his classmates one month after treatment. Considered collectively, these studies offer a firm foundation for future efforts involving indirect contingencies of adult attention to increase the social behavior of young children.

Adult attention also has been used successfully to increase the peer social interaction of older and more severely handicapped children than those involved in the studies reported above (Hall and Broden, 1967; Ramanczyk, Diament, Goren, Trunell, and Harris, 1975; Whitman, Mercurio, and Caponigri, 1970). However, because its effect on the social behavior of more severely handicapped children are less consistent (Fleischman, Hops, and Street, Note 6), several modifications in the typical adult attention contingency often are made: praise might be paired with edible reinforcers to enhance the value of the social consequences for the children; shaping procedures might be employed to allow for more gradual acquisition of social behavior; and the specific behaviors targeted might be changed so that the goals for a given child are consistent with his/her developmental level. Nevertheless, adult attention procedures have been reported to be effective in altering the social interaction of these children, as well as that of children with milder handicapping conditions. Further, all three of these studies (Hall and Broden; Romanczyk, et.al., Whitman, et.al.) report some maintenance of treatment effects following the termination of intervention. Additional work is needed to identify the factors responsible for the development and maintenance of interaction in children with both mild and severe deficits in social behavior. Seven of the ten studies summarized here reported the use of some follow-up procedures. Because five of these seven studies obtained some level of maintenance, this line of research appears to be promising.

Token Reinforcement Systems

Token reinforcement systems represent a somewhat more complex and potentially more powerful class of interventions for low levels of child interaction than those discussed previously. Based on a series of research efforts, Hops and his colleagues (Hops, Walker, and Greenwood, in press; Fleischman, Hops, and Street, Note 6) showed that a contingency of individual points redeemable for group back-up reinforcers was a more powerful arrangement for increasing the peer involvement of socially withdrawn children than were other combinations of point distribution and reinforcer exchange. In this contingency, points are awarded only to the low interacting child, but the item or activity for which the points are exchanged are shared by the child with his/her entire peer group.

Walker, Greenwood, Hops, and Todd (Note 7) explored the effects of token-based contingency arrangements on the topographic components of social interaction -- initiating interactions, responding to the initiations of others, and continuing on-going interactions. When primary grade school children were reinforced either for initiating interactions or for responding to the initiations of others, their overall levels of interaction decreased. However, both reinforcement for continuing ongoing interactions and reinforcement for overall interaction produced substantial increases in children's interactive behavior. Data pertaining to the maintenance of these increases were not reported. It is possible that starting and answering are "momentary" behaviors, while continuing and overall interaction represent "durational" behavior. If this is so, it is further possible that reinforcement of momentary responses, while increasing response rate, inhibits durational responding, thus suppressing the percent of time the subject spends interacting. In evaluating the effects of any intervention, the face validity of the dependent variable and its sensitivity to the particular treatment which is applied are critical. Hops, Walker, and Greenwood (in press) discussed this issue with respect to interventions for socially withdrawn children.

Token, verbal, and control procedures were compared for their effects in increasing "approach" behaviors of withdrawn 8-year-old boys in a clinical setting (Clement and Milne, 1967). Children who received tokens for social behavior in a play group showed a substantial increase in approach responses. Children who received only verbally-based interventions showed smaller increases, and those who took part in a control play group without direct intervention showed no changes. No maintenance data for any of the intervention approaches were reported.

Applications other than those reported here of token reinforcement procedures to problems of social interaction have been made in combination with other intervention components and will be summarized in the next section of this review. The studies presented here suggest that token reinforcement systems, when used alone can provide an effective approach to increasing interaction in socially withdrawn children. However, much work remains to be done in evaluating the maintenance of treatment effects produced by token-based interventions.

Combined Antecedent and Consequent Interventions

Some attempts to remediate the low levels of interaction of socially isolated/withdrawn children have included both antecedent and consequent primary components. Such efforts include symbolic modeling plus reinforcement procedures; instructions, prompting, or live modeling plus reinforcement procedures; social tutoring paradigms; and verbal correspondence approaches.

Symbolic Modeling Plus Reinforcement

Several studies have examined filmed modeling and reinforcement procedures alone and in combination to determine the contributions of the individual components to the effectiveness of the overall package. The results of these efforts are mixed. O'Connor (1972) compared the relative effectiveness of symbolic modeling and operant shaping procedures for increasing peer interaction frequencies of socially isolated nursery school children. The film described previously (O'Connor, 1969) was found effective in bringing the interaction of isolated children up to the level of non-isolated children in the same class. Shaping procedures produced a moderate effect but added nothing to the effects achieved with the film. Moreover, the outcomes of procedures which included a filmed modeling component were more persistent than those which did not. Findings similar to those of O'Connor have been reported by Evers and Schwarz (1973). The latter study used symbolic modeling alone and modeling plus teacher praise for peer interaction to increase the social behavior of isolated and withdrawn nursery school children. Both the modeling and the modeling plus praise groups showed improvement in social interaction, but praise did not appear to add anything to the effects of modeling alone. At a four week follow-up assessment, all subjects had maintained or improved upon their post-test interaction levels.

Walker and Hops (1973) conducted a series of studies in which primary school children were exposed to one of three reinforcement contingencies, with or without first having been shown the O'Connor (1969) film. In experiment I, O'Connor's film was shown to the subject, after which points were awarded to the subject for each interaction resulting from initiations made to her by one of the children in her peer group. In experiment II, the child's peer group was shown the O'Connor film, after which they were able to earn points as a group for each interaction resulting from initiations made to any one of them by the subject. In experiment III, both the subject and her peer group were shown the O'Connor film, then two separate contingencies were instituted. In one contingency, the subject earned points for initiations made by peers, as in experiment I. In the other, peers earned points as a group for initiations made to any one of them by the subject, as in experiment II. The fulfillment of both contingencies allowed each party to exchange their points for back-up reinforcers. In each of these experiments, the combined symbolic modeling and reinforcement procedures substantially increased the social interaction frequency of the withdrawn subject. Moreover, in each experiment, interaction levels maintained above initial baseline levels during five day reversal periods.

The findings concerning component effects in combined modeling and reinforcement interventions are not without disparity. Walker, Hops, Greenwood, and Todd (Note 1) paired symbolic modeling with individual and group reinforcement contingencies to increase the interaction levels of six socially withdrawn children in a public school experimental classroom. Symbolic modeling had no effect. The individual and group contingencies were found to be equally effective in bringing about greater peer involvement of the subjects. Further, follow-up observations conducted at three and six months after the children had been returned to their regular classes revealed continued interaction by the children. Clearly, this finding is in direct contradiction to those of O'Connor (1972) and Evers and Schwarz (1973).

Additional research is needed to clarify the relative contributions of modeling and reinforcement components to treatment packages involving both elements and to determine whether combined treatments have more to offer than do single-component interventions. Maintenance effects achieved in all four of the studies summarized here suggest that they do, and support from peers, as conceptualized in the Baer and Wolf (1970) entrapment hypothesis (explained below), is generally offered as the reason why.

Instruction, Prompting, Live Modeling, and Reinforcement

While many studies have used reinforcement procedures alone or in combination with symbolic modeling to increase the interactive behavior of isolated/withdrawn children, even more have used reinforcement in conjunction with instructions, prompting, or live modeling procedures.

Baer and Wolf (1970) used teacher prompting and praise to increase the social interaction of a low interaction pre-school boy. Within a reversal design, the authors alternated intervention and baseline phases and obtained a cumulative maintenance effect during reversal subsequent to each treatment phase. That is, during each reversal phase, the child interacted at a higher level than he had during any previous reversal phase. Following the third treatment phase, the boy's social behavior in reversal remained at intervention levels. Baer and Wolf offered an explanation for this maintenance effect which they called the "trapping" hypothesis. Briefly, entrapment assumes that within any group of persons, there is an on-going, naturally occurring social environment capable of maintaining the interactive behavior of any group member in the absence of external maintenance-producing factors. In Baer and Wolf's pre-school classroom, the interactive behavior of the children comprised the social environment. In order to become involved in this environment, the low interacting child had only to gain entry into it. Once he had done so, the naturally occurring positive exchanges between children would maintain his involvement. The authors posited that the teacher prompting and praise technique allowed the child to gain entry into the social environment, and that his peers maintained his involvement in it.

Other researchers have subscribed widely to Baer and Wolf's (1970) entrapment hypothesis since it first was offered (Cooke and Apolloni, 1976; Johnson, Goetz, Baer, and Green, Note 4; Walker and Hops, 1973; Walker, Hops, Greenwood, and Todd, Note 1), despite the fact that the study upon which the hypothesis was posited involved only one subject. To date, no systematic effort has been made to replicate the entrapment effect; to expand its applicability to other treatment populations, target behaviors, or intervention procedures; or to determine in more detail how, why, or under what circumstances the effect can be obtained. The research presented in a subsequent section of this report represents an attempt to answer some of these questions.

Strain, Shores, and Kerr (1976) also used a teacher prompting and praise routine. Three behaviorally handicapped pre-school boys showed increases in positive social behavior and decreases in negative social behavior when given teacher prompting and praise for appropriate peer interactions. The procedures also produced treatment "spill-over" effects for other children in the class. Observations during treatment reversal conditions provided limited evidence to support maintenance of these effects.

At least two studies have used a variety of antecedent and consequent intervention procedures. The first (Kirby and Toler, 1970) attempted to increase the social interaction of a low interacting pre-school boy by assigning him the responsibility of passing out candy to his classmates.

Instructions, role-playing, and praise, candy, and monetary reinforcers were used to develop this initiation response and were effective in increasing the boy's overall interaction with his peers. The issue of maintenance was not discussed. The second study (Cooke and Apolloni, 1976) established the target behaviors of smiling, sharing, positive physical contacting, and verbal complimenting for four behaviorally handicapped children in an experimental classroom setting. Increases in all four behaviors for all four children were produced using a combination of instructions, live modeling, and praise. A follow-up assessment conducted after four weeks showed the treatment effects to be durable.

Instructions, prompting, and/or live modeling procedures have been used in combination with reinforcement procedures in non-school settings to increase social behavior in older and/or more severely handicapped persons than those involved in studies reviewed previously. Bornstein, Bellack, and Hersen (1977) reported that a combination of instructions, modeling, behavioral rehearsal, and feedback was effective in increasing eye contact, voice volume, and justified manding of four unassertive children between the ages of eight and eleven years. These behaviors maintained, as assessed during two and four week follow-up probes. Hopkins (1968) increased smiling behavior with two mentally retarded boys using instructions, candy, and social reinforcement. During an extensive follow-up period, one boy showed maintenance of smiling behavior without further intervention. For the other boy, maintenance was achieved when the schedule of candy reinforcement gradually was reduced. Stokes, Baer, and Jackson (1974) found simple prompting and shaping techniques to be effective in increasing the appropriate use of hand-waving behavior by four severely mentally retarded youths in an institutional setting. Data regarding the maintenance of this social response were not reported. Lovaas, Koegel, Simmons, and Long (1973) employed a variety of operant teaching procedures, primarily prompting and reinforcement techniques, to increase pro-social responding such as language and appropriate behavior with 20 autistic children in an intensive residential treatment program. Children who were returned to their natural homes after their parents had been trained to carry out the effective teaching procedures showed continued progress at intervals ranging from one to four years after initial treatment. Children who were placed on an institutional ward revealed severe regression in pro-social behaviors.

In summary, the treatment approach of using reinforcement in conjunction with instructions, prompting and/or live modeling seems to be reliably effective for increasing the social skills of a variety of children and youth. Further, many of the studies found in the literature report that social responding persisted after these intervention procedures were terminated. Generally, naturally occurring reinforcement efforts are used to explain this continued interaction. However, Hopkins has cautioned that when dealing with social behavior, the naturally occurring reinforcers which can maintain newly acquired responses also can maintain undesireable, non-social behavior. Thus, it appears necessary to intervene in the natural environment to make available social consequences contingent on appropriate social behavior. After that, the entrapment effect could occur naturally. Still, little is known about the conditions which reliably produce enduring treatment effects, and little has been done in the way of long-term evaluation of maintenance. These areas should form the basis for future research into the effects of combined intervention approaches such as those discussed here.

Social Tutoring (Coaching)

Several authors have investigated the effects of social tutoring or coaching procedures, on children's social behavior at school. For purposes of this review, the terms "social tutoring" and "coaching" will be used interchangeably. Social tutoring refers to a multicomponent procedure in which an attempt is made to teach children concepts of appropriate social interaction with their peers. An opportunity to practice the corresponding interactive skills with other children then is provided, followed by feedback from the tutor based on the child's performance in the practice session. Most frequently, the concepts taught in tutoring efforts have included participating, cooperating, communicating, and validating/supporting. Corresponding skills which the child would practice and upon which she/he would receive feedback might include joining other children for a game at recess (participating), working together with one or more other children on a common task (cooperating), talking to other children (communicating) and lending attention, help, or encouragement to another child (validating/supporting).

Most social tutoring studies appearing in the literature have been carried out in public school settings with "socially isolated" children in grades three and four. Gottman (1977) distinguished between socially isolated and socially withdrawn children after finding no relationship between peer acceptance scores, as derived from sociometric assessment, and peer interaction levels, as indicated by direct observation, for a group of 113 Head Start children. According to Gottman, "These two measures of (social non-involvement) do not tap the same dimension." The children who typically have been involved in social tutoring (coaching) interventions have been neither accepted nor rejected, but rather ignored, by their peers on sociometric assessments. Frequently in these studies, peer interaction data have not been reported.

Oden and Asher (1977) compared coaching with peer pairing and control conditions for their relative effects on the peer involvement of socially isolated third and fourth grade children. Direct observation measures of children's interaction frequencies showed gains in participation for both groups. However, sociometric measures of peer acceptance revealed significant changes favoring the social tutoring procedures only. In a one-year follow-up assessment, children who had received social tutoring a year earlier continued to improve on peer acceptance scores from the play sociometric.

Hymel and Asher (Note 8) compared an individualized social tutoring paradigm with standardized tutoring and peer pairing procedures. The individualized format involved tutoring directed at specific interaction deficits observed for each child in this group. No differences were found between any of the groups on either observational or sociometric measures. The lack of differences in observational data confirms the outcomes of previously reported social tutoring studies. The absence of sociometric effects, however, is contradictory to those of previous reports. Despite the absence of a treatment effect, Hymel and Asher conducted a seven month follow-up assessment and noted that neither children's interaction frequencies nor sociometric statuses had changed.

A variation of the standardized social tutoring procedure was evaluated by Gottman, Gonso, and Shuler (1976). The study employed videotape, role-playing, and coaching procedures to teach the skills of initiating, friendship-making, and referential communication with two third-grade isolated children. The treated subjects changed (one significantly; one non-significantly) in sociometric position between a pre-intervention assessment and one conducted nine weeks following intervention. They also changed in distribution of peer contacts, but not in overall frequency of peer interactions. Control children did not change on any of these measures. The finding of Gottman, Gonso, and Shuler tends to confirm results obtained by Oden and Asher (1977) -- that social tutoring procedures have different effects on observational data than they do on sociometric measures.

Although social tutoring procedures have much to recommend them, they have little convincing data to support them. Available sociometric data speak well for the tutoring paradigm. However, sociometric data reflect verbal behavior -- what children say they would do in a given situation. They inability of tutoring procedures to impact on children's actual play behavior, as represented by their interaction frequencies, severely limits its applicability for children with low levels of peer involvement. Further, existing social tutoring studies have treated too lightly the issue of behavioral maintenance. Until it can be shown that social tutoring procedures increase children's interactive behavior, and that such behavior persists after intervention has been terminated, tutoring used singly cannot be recommended as an effective procedure for increasing the peer involvement of socially isolated/withdrawn children.

At present, it can be recommended only as one component of a multi-element intervention package.

Verbal Correspondence

Most successful efforts to change children's behavior have brought important responses under the control of stimuli external to the child such as physical surroundings, the presence of other children, or instructions from other adults. In verbal correspondence, children's motor behavior can be brought under the control of stimuli internal to the child, e.g., self-generated verbal responses. Basically, this technique involves reinforcing a child's verbal reports which accurately reflect his/her non-verbal behavior. In a short time, the individual's non-verbal behavior can come under the control of his/her verbal responses. Several authors have used this paradigm to enhance socially relevant behaviors in young children.

Risley and Hart (1968) used a verbal correspondence procedure to increase the use of specific play materials by disadvantaged pre-school children. Children in one group were reinforced with snacks for verbal reports of toy use congruent with their actual use. After exposure to this procedure across a series of play materials, reinforcement for reported use of the materials was sufficient to maintain children's actual play behavior. Succinctly stated, "saying" came to control "doing". With a second group of children exposed to the same procedures, reports decreased to correspond with actual material usage frequencies. Apparently, in order to maintain children's performances of the non-verbal components in the format, their verbal reports would have to continue at high levels. Requiring a verbal report from a child regarding his activity in an important area thus would seem to be an efficient means of programming the maintenance of that behavior. The findings of Risley and Hart have been supported by others. Israel and O'Leary (1973) applied correspondence procedures to the free-play behavior of 16 Head Start children. Reinforcement for verbal behavior alone was insufficient to produce correspondence, as defined by increases in both verbal and non-verbal behavior. Reinforcement which was contingent on both verbal and non-verbal behavior produced correspondence when children's behavior was structured in a "say-do" sequence, but not when a "do-say" ordering was imposed. "Do-say" training was effective only after previous "say-do" experience. No maintenance of these effects was reported. In a subsequent investigation with two groups of normal four-year-old children in a Head Start program, Israel and Brown (1977) found no differences in effectiveness between correspondence training conducted with children having prior verbal training and that carried out with children having no such training history. Reinforcement only for reports of play material usage, regardless of actual play behavior (a component of all previous research on verbal correspondence), may be unnecessary to the development of correspondence. No maintenance of correspondence effects was reported in this study.

Verbal correspondence procedures recently have been extended to child social behaviors other than toy use and free-play. Rogers-Warren and Baer (1976) combined correspondence and live modeling to teach sharing and peer praising to normal pre-school children. Reinforcement for any reports (true or untrue) of these behaviors increased only reporting. Reinforcement for true reports increased both reporting and actual behaviors. Sharing behaviors showed some generality to a second setting. Limited maintenance of sharing and praising responses occurred during treatment reversal phases, but the durability issue was not discussed by the authors. Rogers-Warren, Warren, and Baer (1977) conducted a component analysis of the verbal correspondence procedure with the sharing behavior of eight normal four-year-old children in a daycare program. Modeling of sharing alone and in combination with reinforcement for modelled reports of sharing, self-reporting, reinforcement for any report of sharing, and reinforcement only for accurate reports of sharing were evaluated. Only the last of these components -- reinforcement for accurate reports of sharing -- produced high levels of reporting and sharing for all subjects. Maintenance was not evaluated. This finding is congruent with that reported by Israel and Brown (1977).

The verbal correspondence paradigm holds considerable promise as a cost-efficient method for making progress with a variety of social behaviors in young children. Future research in this area should focus on the extension of the procedures to other target behaviors and subject populations and on the maintenance of behavior which has been increased through correspondence training.

Limitations of Research on the Remediation of Social Isolation/Withdrawal in School-age Children

The research reviewed above reflects some outstanding work in the area of childhood social interaction. Collectively, the outcomes of those studies represent tremendous advances in our ability to increase peer involvement for low interacting children. Yet, the state of the technology in this area reveals several critical weaknesses which provide the direction for future research:

1. Many of the studies conducted to date have involved very small numbers of subjects, some only one child. Although N=1 studies represent important contributions to the literature, replications of these studies are needed to verify that the procedure described can be used effectively with other children, by other intervention agents, and in other settings. The more replications of a given treatment effect that can be documented, the greater our confidence in the program can be.

2. The outcomes from investigations of a given procedure are not always consistent with one another. Research is needed which delineates the conditions under which a given procedure can be expected to be effective. At the same time, related research could be conducted on modifications of the procedure which would allow its extension to other populations, target behaviors, or settings; and/or to more cost-efficient implementations.

3. Past research has failed to place adequate emphasis on evaluating behavioral maintenance. Follow-up monitoring which has been conducted too often has been infrequent, has provided insufficient information to evaluate maintenance effectively, or has not continued long enough to permit assessment of the long-term durability of treatment effects. Maintenance evaluation schedules are needed which provide information in frequent intervals of several days each and which continue for several months. If, through such evaluations, initial treatment effects are found not to persist, strategies need to be implemented to facilitate maintenance. It is this problem which provides the topic for the second major section of this review.

Maintenance of Social Interaction in Children

The maintenance of previously established social behavior in young children will be discussed in this section. First, maintenance will be defined, conceptualized, and justified. Next, some ways in which maintenance can be studied and evaluated will be examined. Finally, several means by which maintenance can be programmed deliberately when it does not occur naturally will be reviewed.

Defining and Conceptualizing Maintenance

Baer, Wolf, and Risley (1968) discussed several features which characterize the discipline of applied behavior analysis. Among them is the generality of behavior change. According to these authors (p. 96), generality may take any of three forms. Initial treatment effects may "prove durable over time" (maintenance), may "appear in a wide variety of possible environments" (stimulus generalization), or may "spread to a wide variety of related behaviors" (response generalization). It is the first of these possibilities with which we will be most concerned in this report. Conway and Bucher (1976) defined maintenance in terms of the resistance of behavior change to extinction. When intervention procedures are withdrawn in the treatment setting, or when they are absent in an extra-therapeutic environment, will the behavior change produced by the procedures persist?

Why should we be interested in the maintenance of behavioral intervention effects? At least three reasons can be cited:

1. Clinical considerations -- Clients who seek behavioral intervention are likely to expect long-term improvement from paid professional

services. For the client's long-term benefit, interventionists should do everything possible to maximize the impact of services delivered.

2. Cost considerations -- From a cost-benefit standpoint, the benefit of an intervention would compare most favorably with its costs when its generality is maximized -- particularly when the long-term maintenance of the effect can be facilitated.

3. Scientific considerations -- As stated by Baer, Wolf, and Risley (1968), a comprehensive technology of behavior change must include the capacity to evaluate and, where necessary, to program the maintenance of treatment effects.

For these and other reasons, professionals cannot afford to ignore questions surrounding behavioral durability. To summarize the state of knowledge concerning behavioral maintenance, the remainder of this review will deal with reports appearing in the professional literature of ways in which maintenance has been evaluated and strategies by which it has been programmed.

Evaluating Maintenance

Several tactics are available for evaluating maintenance of behavioral treatment effects.

1. Comparing follow-up data with previously collected data. Some degree of maintenance might be indicated if the treated individual is responding anywhere between pre-test and post-test levels during follow-up assessment. However, the importance of the maintenance finding must be judged in terms of (1) the amount of time which has passed since post-test assessment, (2) the amount of data available in follow-up,

(3) the current level of responding of the individual, and (4) the trend of the follow-up data. If the follow-up is conducted more than a few days after the post-test, if it includes more than a single measurement, if the level of responding has not fallen off too sharply since intervention, and if the follow-up data are not trending in a countertherapeutic direction, then it could be concluded that a socially significant level of maintenance has been achieved.

2. Comparing follow-up data with appropriate norms. Norms can be established by determining naturally occurring mean levels for the behavior(s) of interest among persons not referred for intervention. Walker and Hops (1976) illustrated the use of normative data in a school setting and pointed out that the use of such data can provide an extremely valuable basis for evaluating both treatment and maintenance effects on a variety of behaviors in many different settings.

3. Comparing data during reversal or criterion reduction phases. If responding remains at or near treatment levels during these conditions, rather than reverting to previous baseline or lower criterion levels, evidence accrues attesting to the durability of the effect. This approach has one obvious disadvantage when compared to the follow-up approach -- it takes place while the experiment is still in progress and thus represents no real evaluation of behavioral persistence across time, save for the few days of the reversal or criterion reduction phase. In addition, achieving maintenance, as evaluated by this strategy, might preclude validating the effect of the intervention procedure (Hartmann and Atkinson, 1973). In a reversal design, for example, a return to near-baseline levels of responding is critical for the explication of an

experimental effect. However, a return to such levels also indicates a failure to achieve maintenance. The two concerns seem to be inextricably opposed, and would-be maintenance evaluators are advised to use the follow-up strategy alone or in combination with the normative data procedure whenever possible.

As mentioned previously, most investigators who have evaluated maintenance have found that it infrequently occurs spontaneously. Consequently, some studies have attempted to achieve maintenance effects deliberately through direct programming. These efforts have led to the gradual development of a small group of techniques which continue to be evaluated for their ability to produce behavioral durability. In the next section, these techniques will be reviewed.

Programming Maintenance

Investigations of strategies for programming generalization of behavioral treatment effects have become more frequent in recent years. This growth has allowed various reviewers to begin categorizing the work which has been done and to impose preliminary structure on this research area. Stokes and Baer (1977) have written one of the most comprehensive reviews to date on the phenomenon of generalization. They offer a structure for programmed generalization research which includes nine categories. Seven of these categories deal specifically with tactics for producing carry-over of treatment effects across stimuli, responses, or time. Of the two remaining classifications offered by Stokes and Baer, one deals exclusively with assessment of generalization; the other with extending treatment programming beyond the original stimulus conditions or target behaviors. The present review adapts the structure presented by Stokes and Baer, refines the number of categories to seven, and deals exclusively with the phenomenon of programmed generalization across time (maintenance). The revised categories (after Stokes and Baer, 1977) are: (1) using natural contingencies; (2) programming common stimuli; (3) using indiscriminative contingencies: (4) mediating generalization (maintenance); (5) training sufficient exemplars; (6) training to generalize (maintain); and (7) programming multiple components.

Using Natural Contingencies

To a then fledgling field of behavior analysis, Ayllon and Azrin (1968) made several recommendations for effective behavioral programming. Among them was the suggestion to teach behaviors which likely would be maintained by the natural environment after direct teaching had been terminated. That advice is no less timely today, a decade after it was first offered. Developing behavior which can be supported eventually by naturally occurring contingencies is an approach which has much to recommend it. Perhaps there is no other procedure which is potentially as simple and as effective. Baer and Wolf (1970) discussed the practice of appealing to natural sources of reinforcement very clearly in their presentation of the "entrapment theory", likening the maintenance of behavior to the trapping of a mouse. Basically, the authors have claimed, if one can teach a child a response which will allow him/her entry into an on-going community of reinforcement, that community will maintain the response, even after formal programming has ended. Although their work preceded the discussion by Baer and Wolf (1970), Hall and Broden (1967) and Buell, Stoddard, Harris, and Baer (1968) also reported the maintenance of newly acquired behavior in children through naturally occurring reinforcement contingencies. It appears from this early research that intervention delivered through agents in a child's natural environment can produce behavior change which persists across time. It further has been postulated that such persistence may be attributable to unprogrammed contingencies operating in the natural environment, and that these contingencies can be relied upon to maintain newly acquired child behavior indefinitely. More recent research has relied less on naturally occurring contingencies to maintain newly developed behavior and has focused more on programmed contingencies to achieve this effect.

Walker and Buckley (1972) used peer re-programming and teacher training as two methods of facilitating the generalization and maintenance of academic and social behavior in regular classroom settings for children who had been treated in an experimental class. A two month follow-up showed peer reprogramming to be the most effective strategy among procedures used in producing durable treatment effects. Similarly, Walker, Hops, and Johnson (1975) reported that when regular class teachers were given consultation services and university credit with grades contingent upon the child's performance, they were able to support the experimental classroom gains made by behavior problem students when those children were returned to regular class placements. These children showed maintenance of treatment effects during a four month follow-up assessment conducted at the beginning of the subsequent academic year. Children who had not received programmed maintenance training in a regular classroom did not evidence the same levels of continued appropriate behavior in follow-up. Jones and Kazdin (1975), after using a token-based reinforcement system to control the inappropriate motor behavior of four mildly mentally retarded students in a special education classroom, used peer and teacher praise alone to produce maintenance of the behavior as assessed by follow-up phases of two and nine weeks. These findings provide evidence that programmed contingencies implemented by agents native to the natural environment can be used effectively to maintain behavioral improvement initially brought about by more direct and powerful interventions.

Both earlier and more recent efforts in the area of behavioral maintenance ultimately have depended upon unprogrammed stimuli in a natural environment to maintain treated behavior indefinitely. However, one cannot always rely on natural agents to continue their support of trained behavior or on naturally occurring contingencies to trap and develop entry responses. On occasion, the support of the agents might itself have to be supported; likewise, newly developed entry responses occasionally might escape the influence of naturally occurring contingencies. When one of these possibilities exists, the subject of the intervention can be taught to "recruit an available but dormant, natural community of reinforcement to maintain his/her behavior" (Seymour and Stokes, 1976; Graubard, Rosenberg, and Miller, 1971). If this can be done successfully, the probability is greater that the behavior of both parties will persist.

Programming Common Stimuli

A second means by which newly developed behavior might be maintained is by programming common stimuli. In this approach, salient stimuli from a training environment are introduced into the child's natural environment. If it can be demonstrated that the stimuli are functional in facilitating performance of the behavior in the new setting and/or across time, then it can be said that generalization and/or maintenance of the behavior have been programmed. Perhaps the best stimuli to employ in this strategy are the child's peers. Physical stimuli in the environment, actions of adults, subject-produced cues, and language provide other examples of stimuli which could be programmed across settings and/or time.

Walker and Buckley (1972) achieved both stimulus generalization and maintenance of academic and social responding in conduct problem children who initially were treated in an experimental classroom setting. By programming common academic materials, teacher procedures, and behavioral consequences across settings, the authors were able to facilitate continued appropriate academic and social behavior by the children across settings and into time. Although the programming common stimuli approach is demonstrated relatively infrequently in the literature, its ease of use, potential low cost, and possible effectiveness make it a procedure worthy of consideration when one is faced with the problem of programming generalization and maintenance of treatment effects.

Using Indiscriminative Contingencies

One approach to maintaining behavior involves a gradual reduction in the discriminability of reinforcement contingencies. Several methods for accomplishing this change are available. Among them are altering the schedule of reinforcement, increasing the delay of reinforcement, using non-contingent reinforcement, and gradually removing or fading the contingency. An even more basic issue than any of these, however, is whether the persons involved will be informed directly about the contingency or not. Resick, Forehand, and Peed (1974) examined this issue with 32 children in a daycare program. The children's instruction following behavior was established with tangible and verbal reinforcers. For some of the children, the contingency was stated directly in advance. For the others, it was not. Non-prestatement of the contingency facilitated maintenance of instruction following behavior. Pre-statement of the arrangement enabled the children to discriminate between the availability and the non-availability of reinforcement and produced less maintenance. While this result is particularly interesting for the study of behavioral persistence, the use of intermittent schedules of reinforcement in the study obscures interpretation of the effect.

Kazdin and Polster (1973) offered a demonstration of the effects of intermittent reinforcement on the maintenance of modified social behavior. Two adult, mentally retarded males who were employed in a sheltered work environment and who exhibited low levels of involvement with co-workers were taught through a continuous token reinforcement procedure to interact with other employees. During a brief reversal phase, the men's levels of interaction, which had increased considerably during the intervention, returned to near baseline levels. Subsequently, the authors programmed intermittent token reinforcement for one worker while continuing the other on a continuous schedule. During a final five day reversal period, the worker who had been on the intermittent arrangement continued interacting with his peers. The worker who had received only continuous reinforcement again reverted to a low level of interaction. Although these results are not unequivocal, they are sufficiently suggestive to arouse curiosity over the possibility of using intermittent reinforcement as an approach to program maintenance of initial behavior change.

Hops, Greenwood, and Ford (Note 9) investigated the maintenance effects of scheduling on a long-term basis. After establishing a criterion level of appropriate classroom behavior in a group of 30 sixth grade children previously labeled as "out of control", Hops, et.al. reduced the frequency of group consequences from a continuous to a variable basis using a performance lottery to determine when the contingency would be fulfilled. Ther terms of the lottery also were changed over time to reduce further the level of support for appropriate classroom behavior. Although these procedures produced moderate levels of maintenance initially, indications were noted that the children's behavior during a three month follow-up was not stable. Still, the use of the lottery-based maintenance system is an interesting approach, and further research to explore its applications and limitations is recommended. The difference between this study and that of Kazdin and Polster -- beyond obvious subject, behavior, and setting differences -- might be not so much in maintenance effects achieved as in duration of follow-up conducted. Much can be learned from diminishing maintenance effects, as well as from stable performances, and more researchers should collect long-term follow-up data as was done by Hops, et.al.. Such data are needed if we are to establish and refine procedures which will produce long-term behavioral persistence.

The use of intermittent reinforcement to maintain behavior also has been described by Koegel and Rincover (1977). The authors first used prompting and reinforcement procedures to teach novel motor behaviors to six autistic children in a residential setting. Once these behaviors were established, Koegel and Rincover were able to study the persistence of the responses. Two characteristics of this study are unique to research on durability of treatment effects: (1) the responses for which maintenance was studied actually were generalized responses from a laboratory training setting; and (2) in addition to using intermittent reinforcement during response training, the authors also examined the effects of non-contingent reinforcement in the generalization setting as an approach to achieving maintenance of generalized responding. Both intermittent scheduling of reinforcement and non-contingent reinforcement were found to facilitate persistence of treatment effects in the generalized setting. The arrangement which produced the most maintenance consisted of a combination of the two reinforcement components -- intermittent contingent reinforcement in the training setting and intermittent non-contingent reinforcement in the generalization setting. This study goes one step beyond previous scheduling research to suggest that the addition of occasional non-contingent reinforcement to a progressively attenuating schedule of reinforcement might further enhance the durability of behavior produced under the original schedule. This potentially important finding merits further study.

Greenwood, Hops, Delquadri, and Guild (1974) reported on the maintenance of appropriate classroom behavior of students in three elementary school classrooms following intervention with a packaged program consisting of rules, feedback, and group and individual contingencies. Once appropriate behavior had been established, increasing delays were inserted between the students' classroom performances and access to reinforcing group activities. Follow-up data collected three weeks after program termination indicated that treatment effects were persistent. Several factors, including the programmed reinforcement delays, could be used to explain this observed durability, but the authors acknowledge that attribution of the effect can not be determined adequately from the study. Still, the finding adds support to the possibility that reinforcement delays facilitate maintenance. Further support for the use of reinforcement delays has been added by Jones and Kazdin (1975), who used token reinforcement procedures to control inappropriate motor behaviors of four mildly mentally retarded children in a special education classroom. As one component of a maintenance programming package, reinforcement delays were inserted between children's behavior and available group consequences. Two and nine week follow-up data lent credibility to the practice of using delayed reinforcement as one of a series of procedures to enhance behavioral persistence subsequent to intervention.

Perhaps the surest approach to take when programming maintenance is one in which several potential maintenance-producing procedures are combined. Greenwood (Note 10) provided an example of this strategy. Greenwood used a classroom token economy to increase appropriate in-class behavior among a group of 24 elementary-age children with a variety of learning and behavior problems. Once classroom behavior was under control, Greenwood began attenuating the reinforcement system in several ways: by increasing the behavioral requirements for reinforcement; by increasing the time between token acquisition and token exchange; by inflating the prices of back-up reinforcers; and by replacing physical with symbolic tokens. These attenuation procedures were carried out with no observable loss of control over the children's behavior. Although research still is needed to isolate single techniques which are functional in producing maintenance of modified behavior, Greenwood's maintenance package strategy has much to recommend it, especially in situations where clinical considerations outweigh those of research. That is, the multi-faceted programming approach should have a greater maintenance-producing capability.

A final approach to the challenge of making reinforcement contingencies indiscriminative may be found in the practice of program fading -- the gradual removal of intervention components. An example of this approach has been provided by Greenwood, Hops, and Walker (1977). The authors first used a packaged intervention program to increase academic survival skills in a group of 36 children representing six primary level public school classrooms. Following establishment of appropriate work and study behaviors, each of the six classrooms involved was assigned to one of three maintenance conditions. For two of the classrooms, the packaged intervention program was terminated, and unprogrammed maintenance was evaluated. For two additional classrooms, the full program was continued. For the final two classrooms, the components of the packaged program were faded out systematically. During a nine week follow-up period, the program termination group showed maintenance in one out of two intervention periods; the program fade-out group showed maintenance in both periods. Not unexpectedly, the program continuation group also continued to perform academic survival skills in both periods. The results for the program termination group speak well for the maintenance-producing capability of the packaged intervention program. The findings with the program fade-out group also speak well for the program and for the systematic fade-out procedures. More research is needed to establish the procedures and parameters of effective fading for other intervention programs, subjects, and behaviors.

Mediating Generalization

Stokes and Baer (1977) used the term, "mediated generalization" to refer to carry-over of treatment effects which may be produced by procedures requiring subject involvement in implementation of the independent variable. Examples of such procedures include verbal correspondence and self-control paradigms. In both approaches, the subject must mediate or bridge the gap between second-party control and his/her own behavior. In the former, the gap may be mediated by language; in the latter, it is mediated by one or more components of self-control -- self-assessment, self-recording, self-instructing, self-determination of reinforcement, self-administration of reinforcement, etc. If the subject can be taught to bridge this gap, his/her mediating behavior -- the verbal or self-controlling response -- might come to control his/her target behavior, thus obviating the need for control by an external agent and facilitating the maintenance of the target behavior. Several studies using a verbal correspondence paradigm to develop social skills in young children already have been described. Unfortunately, none of these studies deals with the question of behavioral maintenance following termination of the intervention procedures. Conjecture leads one to predict that verbal correspondence procedures might have maintenance facilitating capabilities. However, empirical verification of this suspicion remains to be undertaken. Fortunately, the study of maintenance produced through mediation by self-control is more advanced.

Broden, Hall, and Mitts (1971) used self-recording procedures to increase the in-class study behavior of a normal eighth grade girl. Initially, the girl's behavior did not maintain during a brief treatment reversal period. Reinstatement of the procedure re-established a high level of study behavior. Teacher praise then replaced self-recording procedures, and finally, praise also was terminated. Study behavior continued uninterrupted throughout these final two phases, suggesting that self-recording and natural contingencies can produce durable treatment effects. Glynn, Thomas, and Shee (1973) also reported on the use of self-control procedures to maintain study behavior. After the on-task behavior of 37 normal second grade children was established through external contingencies, a four-component self-control procedure was implemented. Self-assessment, self-recording, and self-determination and administration of reinforcement maintained on-task behavior at external control levels throughout five and seven week follow-up periods. Findings similar to those of Glynn, et.al. were reported by Thomas (1976) who employed self-assessment with preferred activity back-up reinforcers to improve the on-task behavior of eight normal second grade children in a regular public school classroom. Children's on-task behavior increased during implementation of the self-control procedure and maintained at treatment levels for more than two months.

Self-control procedures also have been reported to facilitate maintenance of treatment effects for problem children outside of the regular school environment. Turkewitz, O'Leary, and Ironsmith (1975) awarded points and back-up reinforcers within a token reinforcement system for accurate self-ratings by eight severely disruptive children, ages 7-11, who were enrolled in an after school tutoring program. Once significant gains had been achieved in children's social and academic behaviors, the requirement that children's self-ratings match teachers' ratings of the children's behavior was faded until subjects controlled their own point distribution. Back-up reinforcers also were faded. Disruptive behavior was reduced markedly by the intervention procedure, and treatment effects maintained during the period in which back-up reinforcers no longer were available.

Taken together, the findings of the few studies reviewed here suggest that behavioral maintenance may be achieved by giving subjects one or more critical skills which may be used to mediate the gap between external control and their own behavior. Well-established self-control strategies offer considerable promise in allowing subjects actively to maintain their own behavior. Hopefully, future research in the area of verbal correspondence will establish the effectiveness of that technique in producing behavioral persistence, as well.

Training Sufficient Examplars

During its brief history, behavioral intervention had been characterized by an emphasis on establishing behavior within a very narrow range of stimuli. Precise adherence to the theoretical model of behavior change has required change agents to bring a specific response under the control of a particular stimulus through application of a carefully delineated consequence. By following this paradigm, researchers have been able to demonstrate repeatedly that a functional analysis of behavior is possible in applied settings. In recent years, people have come to be interested in practical issues related to behavior change -- whether responses similar to a targeted response can be changed concurrently, whether behavior changes can occur simultaneously under stimulus conditions other than those present in training, and whether behavior changes will persist in time. One seemingly obvious approach to achieving these desireable side effects is to instruct the subject to perform behaviors related to the trained behavior, to do so in a variety of related stimulus conditions, and to continue doing so indefinitely. However, use of instructions to achieve generalized effects of behavior change is not supported by available data. Hops, Greenwood, and Guild (Note 11) found that instructing teachers to increase praise in one period after being trained to do so in a previous period was ineffective. Reliance upon the instruction-following behavior of our clients will not move us far toward a technology of behavioral generalization. And so we begin to look for other ways to accomplish these more widespread effects of our work.

One approach to more efficient behavior change is offered by the direct instructional model of teaching (Bateman and Carnine, 1977). This model establishes generalized correct responding by teaching concepts and operations related to a targeted behavior. New instances of a concept are presented until a concept is formed. Although this model has been applied almost exclusively to the development of academic skills in primary age school children, its applicability ranges virtually to every effort of behavior change. This point is illustrated in a study conducted by Stokes, Baer, and Jackson (1974).

Stokes, et.al. used prompting and shaping procedures to establish a simple social greeting response (hand-waving) in four institutionalized, severely mentally retarded children. The procedures were effective in establishing the behavior readily, but the children's responses were limited to the presence of the individuals by whom they were trained. Subsequently, training was re-introduced by a second trainer who was accompanied by the first trainer. With the onset of this expanded training, children began using the social greeting response in the presence of other staff members who never had trained them. These results suggest that the children acquired the concept, "Wave when I see an adult staff member and/or when she/he waves at me." Although Stokes, et.al. do not report whether the trained children also used the greeting response with other children or with non-staff adults, their level of performance at the end of the study clearly represents an example of generalized responding, and this responding apparently was brought about by introduction of the second trainer. Seemingly, one also could program across other stimulus dimensions or across related responses to produce similar generalized effects. The question of how many examples constitute a sufficient number of instances to form a concept when training sufficient exemplars has not yet been answered empirically. Given that the children in the Stokes, et.al. study, characterized as severely retarded, required only two stimulus instances to begin generalized responding, it is possible that the number will be less than we might predict. It is hoped that research will be undertaken in the near future to expand upon our knowledge of this form of programmed generalization. Specifically of interest for this review is the question of whether concepts established through the training of sufficient exemplars will hold up over time. If the approach can be used to produce generalized social responding in other subjects, an individual's chances that one of those responses will gain entry into a natural community of reinforcers will be multiplied, and the possibility that his/her behavior then will persist will be enhanced greatly.

Training to Generalize

Stokes and Baer (1977) discussed "training to generalize" as a final approach to programming generalization of treatment effects. In this strategy, generalization is treated as a response and is consequated. Its primary characteristic is that it has not been taught directly to the subject. Reinforcement might be made available only for novel responses or for movement along a specified generalization gradient. Parsonson, Baer, and Baer (1974) provided an example of this strategy with implications for the study of maintenance. Two preschool teachers were trained through observer feedback to apply generalized appropriate social contingencies to the desireable and undesireable behavior of mentally retarded children in their classrooms. This training was effective in developing the teachers' generalized correct use of attention to child behavior, and this skill proved durable, as indicated by follow-up assessments of eight and eleven weeks' duration respectively for the two teachers. Herbert and Baer (1972) made a similar finding of treatment effectiveness, generalized responding, and behavioral durability with parents who were taught to self-record their attention to the behavior of their children. The findings of durability subsequent to these demonstrations of intervention effectiveness are particularly interesting. This generalization training strategy appears to be similar to that labeled "training sufficient exemplars" by Stokes and Baer. If sufficient examples of a particular behavior (teacher or parent attention) are trained, it is possible to develop a generalized or conceptual mastery over appropriate performance of the behavior. Once the behavior is generalized or conceptualized, its durability may be facilitated. Additional research must be carried out with this strategy before the relationship between generalized and durable responding can be more fully understood. If the relationship can be explicated, the strategy will have much to offer for the training of other behaviors.

Programming Multiple Components

Some studies have used a combination of strategies outlined above to facilitate generalized treatment effects. Such an approach is represented by CORBEH's CLASS Program (Contingencies for Learning Academic and Social Skills; Hops, Beickel, and Walker, Note 12) which uses natural contingencies, programs common stimuli, and eliminates the discriminative properties of the contingencies in order to achieve broad and lasting control over the acting out behavior of primary grade children in public school classrooms. Like the work of Greenwood (Note 10), discussed above, the CLASS Program and several other packaged intervention strategies developed by CORBEH and other agencies incorporates a multi-faceted maintenance-facilitating approach in order to maximize the likelihood of achieving lasting changes in behavior. Although such an approach likely precludes determination of the contribution of each component to behavioral durability, clinical considerations in achieving maintenance usually outweigh such research interests by the time the program has researched the dissemination stage. The multi-component approach is recommended when simply obtaining maintenance is more important than determining how it was obtained.

The study to be described in the pages which follow made use of several of the generalization-facilitation strategies presented by Stokes and Baer (1977) and summarized in this literature review. They include the following:

1. Using natural contingencies. Classroom peers and teachers played critical roles in intervention, providing structure, support, and feedback for subjects' newly developed social behavior. Activities in which subjects were encouraged to become involved included those in which their peers were engaging on a regular basis. Back-up reinforcers in the point system consisted of group privileges natural to the classroom environment. In summary, naturally occurring privileges and social contact were used by naturally present social agents (teachers and peers) to reinforce subject participation in naturally occurring social activities in the school setting.

2. Programming common stimuli. Peers, social activities, and physical settings were present as common stimuli across both treatment and non-treatment conditions of the study.

3. Training sufficient examplars. Social tutoring procedures were directed at establishing concepts of appropriate social interaction by teaching positive and negative instances of these concepts.

4. Training to generalize. Through the use of social tutoring, it was hoped that concepts of appropriate social interaction could be established which would allow subjects to engage in a variety of social behaviors under a variety of stimulus conditions for an indefinite period of time into the future.

Two of the Stokes and Baer strategies, using indiscriminative contingencies and mediating generalization, were not represented in the maintenance-facilitation paradigm utilized in this research. Future investigation in this area which incorporates these two strategies would be well-received. From the above review of social interaction programming and maintenance facilitation, we are led to a description of the methods employed in the present study.

METHODOLOGY

CORBEH

The Center at Oregon for Research in the Behavioral Education of the Handicapped (CORBEH) is a national research and development center in the area of behavior disorders sponsored by the Bureau of Education for the Handicapped, U.S. Office of Education. The primary mission of the Center is the development, evaluation, and delivery of standardized intervention packages for homogeneous subgroupings of behaviorally handicapped children in regular public school settings.

The Development of the PEERS Program

This research was conducted as a follow-up to the development of CORBEH's Program for the Establishment of Effective Relationship Skills (PEERS: Hops, Fleischman, Guild, Paine, Walker, and Greenwood, Note 5). The PEERS Program is one of four CORBEH programs already developed or in the final stages of development, each designed to remediate a specific behavior problem of elementary school children within the regular school environment. Three other CORBEH programs, Contingencies for Learning Academic and Social Skills (CLASS: Hops, Beickel, and Walker, Note 12), Program for Academic Survival Skills (PASS: Greenwood, Hops, Delquadri, and Walker, Note 13), and Re-programming Contingencies for Effective Social Skills (RECESS: Walker, Street, Garrett, Crossen, Hops, and Greenwood, Note 14) have been designed for acting out, low survival skill, and negatively interacting children, respectively. The PEERS Program has been developed over the past four years to increase the peer involvement of children with low levels of social interaction.

Evaluation of the PEERS Program to date has followed the three-stage CORBEH research model (Walker, Hops, and Greenwood, 1976) which includes: (1) Identification and functional analysis of salient program components within an experimental classroom setting (Walker and Hops, 1973; Walker, Greenwood, Hops, and Todd, Note 7); (2) Use of the consultant model of service delivery to evaluate the program in local public schools (Hops, Walker, and Greenwood, in press); and (3) External field-testing of the packaged program by training resource personnel from other school districts in the use of PEERS procedures (Greenwood, Hops, Walker, Guild, Stokes, Young, Keleman, and Willardson, in press; Hops, Walker, and Fleischman, in press).

The PEERS Program has been evaluated in the local public schools (Stage 2, above) with CORBEH personnel serving as consultants to regular classroom teachers for the past three years (See Table 1). During the first year of this period, six children were involved in the program, and intervention was limited to the classroom setting. None of these children took part in the follow-up research reported in this paper. During years two and three, the primary component of the program, a contingency of individual points exchangeable for group activities, was moved from a classroom free-time period to a playground recess period. Ten children received this form of the program over the two-year interval. In year three of Stage 2 research, four additional children were referred

TABLE 1

Summary of PEERS Program Stage II Research Over a 3 Year Period

(Implementation of Program by CORBEH Consultants in local public schools)

Year	Number of Children		Intervention Setting	Follow-up Involvement
1	6		Classroom only	None
2	7		Classroom and Playground	Full for 3 out of 7
3	7	3	Classroom and Playground	Full for 2 out of 3
		4	None	Full for 4 out of 4

and accepted for the PEERS Program but did not receive any intervention until the present project began.

Subjects

Initial Referral to the PEERS Program

The 10 children who had previously been treated had been referred originally to the PEERS Program by their classroom teachers because of observed low levels of interaction with classmates in social situations such as free-time and recess. Each teacher referral was followed by a visit to the school by a CORBEH consultant to corroborate the teacher's observation and to determine whether the child was likely to benefit from the program. A screening period of five to ten days then was conducted in which the referred child and a random sample of five classmates were observed on the playground during each recess period. Two criteria were used to screen the children for eligibility: (1) the data on the referred children's randomly selected classmates, pooled across schools, provided social interaction norms by grade level for the Eugene-Springfield area (these data are presented in the PEERS Consultant Manual; Hops, Fleischman, Guild, Paine, Walker and Greenwood, Note 5); and (2) the mean interaction level of the child's classmates provided a criterion for his/her class. If during the screening period the referred child interacted at more than one standard deviation below his/her grade level or class mean, s/he was accepted for intervention in the PEERS Program. If s/he did not meet either criterion, all concerned persons were told that the child was not likely to benefit sufficiently from the program to merit its implementation.

Follow-up

Observations were conducted for nine of the 10 previously treated children. The tenth child had moved. Observations were made at intervals ranging from one month to six months after completion of initial interventions. Based on this information and on teacher and parent reports, seven of the nine children observed in follow-up were selected for further intervention. Subsequently, two of these seven children also moved, leaving five previously treated children available for inclusion in this study. Of the two children observed at follow-up but dropped, one was in a class involved in another CORBEH project, and the other was interacting at a level similar to her peers. Follow-up observations lasted from five to ten days, were conducted during each recess period, and included observation of a random sample of the child's classmates. Table 2 presents a summary of subject characteristics for children participating in the present research.

Dependent Variables and Measurement Procedures

Direct Observations

The Revised Peer Interaction Recording System (PIRS II: Hops and Stevens, Note 15) was used to collect observational data on several dimensions of children's social behavior. PIRS II is a seven-category, six-second, interval coding system which provides percent social behavior, percent verbal behavior, percent of interactions initiated, mean duration of interactions, and interaction rate as dependent variables. Percent social behavior has been shown in previous research (Hops,

TABLE 2

Summary of Subject Characteristics

Expt./Subj.	Gender	Grade	Treatment* History	Screening	Baseline	Inter-vention	Follow-up
I / A	F	1	PT	32	40	60	37
B	M	1	PT	14	13	81	29
C	F	4	PT	46	31	79	49
II / D	M	4	UT	--	--	--	--
E	F	4	UT	--	--	--	--
F	M	3	UT	--	--	--	--
G	M	3	UT	--	--	--	--
III / H	F	1	PT	7	5	91	34
J	M	1	PT	18	29	84	28

* PT = Previously Treated
UT = Previously Untreated

Fleischman and Street, Note 16) to be a more sensitive measure of social interaction than rate or other available measures, and thus was adopted as the primary dependent variable for the research reported here. The other variables listed above provide useful auxiliary measures and allow for an analysis of changes in the topography of social interaction, as well as in its overall level of occurrence.

Professionally trained and supervised personnel served as observers. Their reliability with calibrating observers was checked at least once during each experimental phase for each subject. Reliabilities were determined by computing Pearson's correlations between the records of primary and calibrating observers for both subjects and peers, for all groups, and for each of the dependent variables in the coding system. A standard of .80 was used to evaluate the acceptability of reliabilities obtained in this study.

Observers collected data during one recess period daily for each subject. On most days, a second observer was present to collect data on the social behavior of a sample of the child's classmates. As has been discussed by Walker and Hops (1976), these peer data serve both as a standard against which to evaluate subjects' performances in the program and as an index of the social climates in which the subjects must function on a regular basis.

Social Validation Measures

One purpose in carrying out the combination of measures described below was to allow for the social validation of programming and maintenance effects by comparing observational data with teacher, parent, and peer rating data.

Social validation involves visually or statistically correlating two or more measures of the same behavior to determine whether changes measured by a sensitive objective recording system (observational code) are also socially significant. One can identify at least two functions served by social validation. One function is to verify the importance of the behaviors which have been targeted for change (Fawcett and Miller, 1975). Behavioral changes recorded by an observation instrument and by more subjective ratings would indicate that the targeted behaviors also were significant to social agents. Still, failure to socially validate a measured intervention effect does not necessarily mean that the wrong behaviors have been changed. Perhaps the effects were not of a sufficient magnitude to be meaningful to a validation rater or meaningful effects obtained in one setting were not observed in a different setting in which the rating took place. Because one of the defining characteristics of applied behavior analysis is socially significant behavior change (Baer, Wolf, and Risley, 1968), however, changes in behavior which are unnoticeable to referring agents or other important persons in the subject's environment must be considered socially insignificant, regardless of the reason for failing to validate.

A second function of social validation is to help determine the responsiveness of the subject to the intervention (Minkin, Braukmann, Minkin, Timbers, Fixen, Phillips, and Wolf, 1976). The face validity of the behaviors reinforced in the present interventions is high, and the magnitude of effect obtained with these procedures previously has been shown to be large (Walker, Greenwood, Hops, and Todd, Note 7). Therefore, it is the second of these two functions, determining the benefit to the subjects as rated by significant others, which is being served by attempting to socially validate the effects shown by the observational data in this research.

In the present study, the variable labeled percent social behavior and the direct observation procedures provide a sensitive index of changes in level of social interaction. To determine whether those changes were socially significant, the observational data were visually correlated with teacher, parent, and peer rating data. Substantial agreement between measures indicating that a given child has shown improvement as a result of participating in the study adds support to the use of these intervention procedures. Samples of the rating scales used in this study are attached as Appendices I and II.

1. Peer Sociometric Ratings. Several authors have suggested the use of sociometric ratings as useful indicators of peer acceptance (Gottman, Gonso, and Rasmussen, 1975; Drabman, Spitalnik, and Spitalnik, 1974). Therefore, sociometric ratings of playmate and workmate preferences were made by subjects and their classmates on a pre- post-intervention schedule.

On an individual basis, children were shown a collection of pictures of other children in the class. Each child first was asked to point to his/her picture and then to point to the pictures of other children in response to each of the following situations:

a. "Let's pretend that we're going out to recess to play a game. I'm going to make you the captain of one of the teams and I want you to pick six people to be on your team with you. Point to their pictures."

b. "Let's pretend that you are going to work on a project in class. Your teacher has said that you can pick six people to work on your project with you. Point to their pictures."

c. "Let's pretend that you are going to play with some people away from school at a park. You get to pick six people to come and play with you. Point to their pictures."

2. Teacher ratings. The Social Interaction Rating Scale (SIRS), developed for the PEERS Program and similar to the Withdrawn Scale from the Walker Problem Behavior Identification Checklist (Walker, 1970), was completed on a pre- post-intervention basis -- once during the first baseline period and again during the last baseline period. The scale consists of two parts -- a 15-item yes-no checklist of specific behaviors and a list of ten continuua descriptive of child characteristics. In addition to rating the subject, teachers rated each of the five control children in their classes, as well.

3. Parent ratings. Parents of the subject and of the randomly selected peers completed the Parent Rating of Child Characteristics (PROCC: adapted from Becker and Krug, 1964, and developed as a screening/assessment instrument for the PEERS Program) on a pre- post-intervention basis. The PROCC provided parent ratings of ten descriptive continuua related to children's social interaction.

Project Design

Individual reversal designs were employed for each subject, alternating four baseline and three treatment phases. Initial baseline conditions for each child were continued until his/her social behavior had become stable or was decreasing. Intervention phases lasted five sessions; baseline conditions lasted between five and nine days. These phase durations were based on previous research (Walker, Greenwood, Hops, and Todd, Note 7) indicating (a) that full intervention effects usually are attained within five sessions and (b) that reversals of behavior, if they occur, take place within approximately five sessions. As many extra days as time would permit were included in each baseline phase to provide additional evidence that the behavior was or was not going to maintain above initial baseline levels.

The reversal design provided a logical framework for studying the problem of maintaining previously produced intervention effects. Each programming phase constituted a brief series of intervention booster sessions. The baseline phases facilitated studying the effects of these repeated interventions on the maintenance of child social behavior after programming had been terminated. The number of intervention phases, set at three, was based on the finding of Baer and Wolf (1970) that following the third application of their successful intervention, the subject's behavior maintained at treatment levels. Maintenance at treatment levels was not expected in the present project, however, as the procedures used here produce extraordinarily high levels of social interaction. Rather, maintenance of subject behavior at grade levels seems to be a more appropriate criterion against which to evaluate the present treatment effects.

Intervention Procedures

The procedures applied in intervention booster sessions were comprised of two components -- a recess-based point system and an in-class social tutoring procedure.

1. Point System. The point system was operated by a CORBEH consultant. Each day the program was in effect, the consultant and teacher led a brief class meeting which immediately preceded the intervention recess period. No special activities surrounded the other recess periods during the day. During the meeting, which required between five and ten minutes, the following events took place:

a. From among two or three alternatives listed by the teacher, the class determined by popular vote what activity would serve as their back-up reinforcer for the day. Teachers were asked to suggest activities which required little time (5-10 minutes) and which involved no cost. Activities which frequently were presented by teachers and selected by children for this purpose included in-class games played by the entire class (e.g., "7-up", charades, spelling games), special "media" activities (e.g., listening to records, hearing a story, seeing a filmstrip), and extra time for regularly scheduled activities (e.g., recess, free-time, art).

b. A point goal for the day was announced. This goal was derived by finding the median percent social behavior for the subject over the previous three observation days, adding one percentage point, and stating the number as a score which the class had to help the subject beat if they were to win the "recess game" that day. The goal was never set higher than one standard deviation above the child's grade level mean for social interaction. The goal later was used as a criterion for determining whether to award the group back-up activities for the day.

c. Approximately three children were designated each day as "special helpers" to the subject. Children were told that as special helpers, it was their responsibility to talk and play with the subject and thereby help him/her earn points for the day. The assignment of helpers was made on a rotating basis so that over several program days, each child in the class had an opportunity to serve in this capacity. The children not designated as helpers on a given day were told that they could join the games which the subject and special helpers were playing and also help the subject earn points. Several children usually assumed this "non-designated helper" role each day.

d. The subject and the children who had been designated as special helpers were asked to name at least one game each which they could play to help earn points. Other children also were allowed to suggest recess activities if they volunteered to do so. The children were encouraged to start playing one of the suggested activities together as soon as they reached the playground. All children then were excused for recess.

The consultant spent the recess period on the playground with the class. During this time, s/he prompted the child and his/her classmates, to the extent necessary, to talk and play together. The consultant suggested age-appropriate games which would facilitate interaction among the children and praised children for choosing and starting such games. As social behavior continued, the child was praised intermittently by the consultant and was reminded that such behavior earned points. The children who talked to and played with the subject also were praised for helping him/her earn points.

The consultant used a simple interval coding system to determine the number of points the child earned during the intervention session. Each six-second interval on the code was scored as either social or non-social, based on the behavior of the child during that brief period. Later, this information was converted to a percent of intervals score, this score was reported to the class as the number of points earned, and this number was compared with the point goal which had been established for the day. If the number of points earned was equal to or greater than the number needed, the entire class was awarded the activity which they had chosen. If the child did not meet his/her point goal, the children were told and then verbally quizzed about what they could do to make sure that the subject met the goal the next day.

2. Social skills tutoring. Social skills tutoring, conducted by the consultant, consisted of direct instruction lessons in five concepts of social interaction -- initiating interactions, responding to the initiations of others, continuing interactions already underway, peer praising, and cooperating. Lessons were based on scripts which had been developed for each concept. Samples of these scripts are included in the PEERS Manual for Consultants (see note 5). The lessons were taught in the order listed above, and each lesson was taught once during each of the five day intervention phases. On each day that the program was in effect, tutoring was conducted just prior to the class recess meeting and lasted approximately 15 minutes.

Social tutoring sessions involved the subject and one classmate for five consecutive program days. The classmate was chosen for his/her ability to model appropriate social behavior. A different classmate was chosen as the social skills tutoring helper for each of the three intervention phases.

Within the lesson, the consultant gave instructions above the topic skills, verbally quizzing the children at each step to determine whether they understood the information. Next, s/he role-played both positive and negative examples of the skill for the children, and finally, instructed the classmate and the subject to role-play examples between themselves. Throughout each phase, the consultant provided praise and corrections to the children based on their responses.

The present research project consists of three experiments. Identical procedures were used in each; they differ only in terms of the subjects involved and their intervention histories.

Experiment I

Three subjects, one boy and two girls, served in Experiment I. Two were first graders; the third in fourth grade. The time lag between the end of their first involvement in the PEERS Program and the beginning of the follow-up intervention provided in this project was approximately ten months. At the time of initial intervention for these children, all of the present components of the PEERS Program had not been developed. Thus, their first programs consisted of only two components -- the recess-based point system and an in-class joint-task procedure. The original point system used was identical to that described in the procedures section above.

The joint-task, a peer-pairing procedure, was run by the child's teacher. It consisted of pairing the child with one classmate each day during a free-time or work period and assigning the children to work on some activity together. The activity was either an academic (e.g., flashcards, word games) or a play (e.g., table games, building blocks) task. The teacher praised the children intermittently for interacting during the 10-minute work or play period. The assignment of the classmate with whom the child was paired rotated each day so that over the course of approximately four school weeks, the child had an opportunity to interact with each of the other children in the class. Like other structural and task arrangements previously described in the literature (Burgess and Nielsen, 1974; Mithaug and Wolfe, 1976), the purpose of the joint-task procedure was to employ a minimally demanding intervention strategy to increase the withdrawn child's interaction with his/her peers in a classroom situation.

Experiment II

The four subjects were a fourth grade boy, two third grade boys, and a fourth grade girl. None of these children previously had been involved in a PEERS intervention. Neither, to the best of our knowledge, had any of them received any other services designed to increase their levels of social interaction with other children.

Experiment III

Two first graders, a boy and a girl, were involved in Experiment III. They experienced approximately a two month lag between the end of their initial interventions and the onset of follow-up programming. These children had received the entire PEERS Program including all of its present components. Thus, in addition to the point system and joint-task procedures described above, children in Experiment III were given social tutoring and a verbal correspondence procedure.

The social tutoring received by Experiment III subjects in their initial interventions was slightly different than that included in their follow-up programs. Initially, only three social tutoring lessons were used -- initiating interactions, responding to the initiations of others, and continuing interactions already underway. Each lesson was taught only once, in a three-day tutoring-only phase which immediately preceded the first day of the child's recess point intervention. The scripts for these lessons and the procedures for the use of a single classmate as a peer model were the same as those described previously.

The verbal correspondence procedure was operated by the child's classroom teacher in a second recess period when the consultant was not present. Just prior to each of the daily recess periods, the teacher asked the child and one of his/her classmates to play together during the recess period. S/he also told the children that s/he would ask them at the end of the period whether they played together and if so, what they played and whether anyone else played with them. After recess the child was asked to verbalize this information, and the classmate to verify the child's report. The child was praised both for truth-telling and for social interaction, and the classmate was thanked for his/her help. The purpose of this procedure was to promote child interaction with classmates at times of the day when the more structured point system was not in effect and to do so with minimally demanding intervention procedures. The effect of using "say what you did" to produce "doing what you say" has been called verbal correspondence and has been described in more detail by other authors (Israel and O'Leary, 1973; Lovaas, 1961, 1964a, 1964b; Risley and Hart, 1968; Rogers-Warren and Baer, 1976; Sherman, 1964).

RESULTS

Reliability

Social Behavior

Totals of 38, 50, and 25 inter-observer reliability checks were made in Experiments I, II, and III, respectively. Between one and four such checks were made in each phase of the study for each subject. Overall reliability on the social behavior of subjects and peers for the three experiments averaged .99, .96, and .99, as determined by the Pearson product-moment correlation method. These obtained reliabilities compare favorably with the pre-established criterion of .80.

Verbal Behavior

Reliability checks on verbal behavior were made concurrently with those on social behavior. Combined reliabilities on the verbal behavior of subjects and peers averaged .92, .93, and .59 in Experiments I, II, and III, respectively. Reliability on the verbal behavior of subjects and peers in Experiment III fell far short of the .80 standard previously set to define the limits of acceptable agreement between observers. For this reason, the reader should exercise caution in interpreting verbal behavior data in Experiment III.

Experiment I

All three subjects in Experiment I showed maintenance within normative levels of social behavior during the final baseline period.

This outcome was generally supported by the social validation data. No discernable effects were noted on subjects' verbal behavior.

Percent Social Behavior

The social behavior of individual children in Experiment I is graphically presented in Figure 1. Shaded areas on the graphs represent the normative range (the mean, indicated by the heavy horizontal line, plus and minus one standard deviation) of peer involvement for each subject's respective grade level.

All three children showed levels of social behavior consistently below those of their peers and generally below grade norms throughout initial baseline periods. The social behavior of both subjects and peers was highly variable throughout all baseline phases.

The effects of the intervention package were immediate and substantial for all three subjects. Introduction of the tutoring and point contingency: (1) produced high levels of peer involvement; (2) reduced the variability in performance, and (3) partially reversed the position of subject and peer social behavior levels. These effects were noted each time the package was introduced.

Some reversion of subject involvement toward baseline levels was noted when treatment procedures were withdrawn. Since the power of the intervention procedures boosted social behavior to more than one standard deviation above grade norms, however, such reversion was to be expected. Nevertheless, with successive treatment phases, less of the intervention effect was lost in the subsequent baseline condition. This maintenance effect can be seen most clearly by comparing subject levels

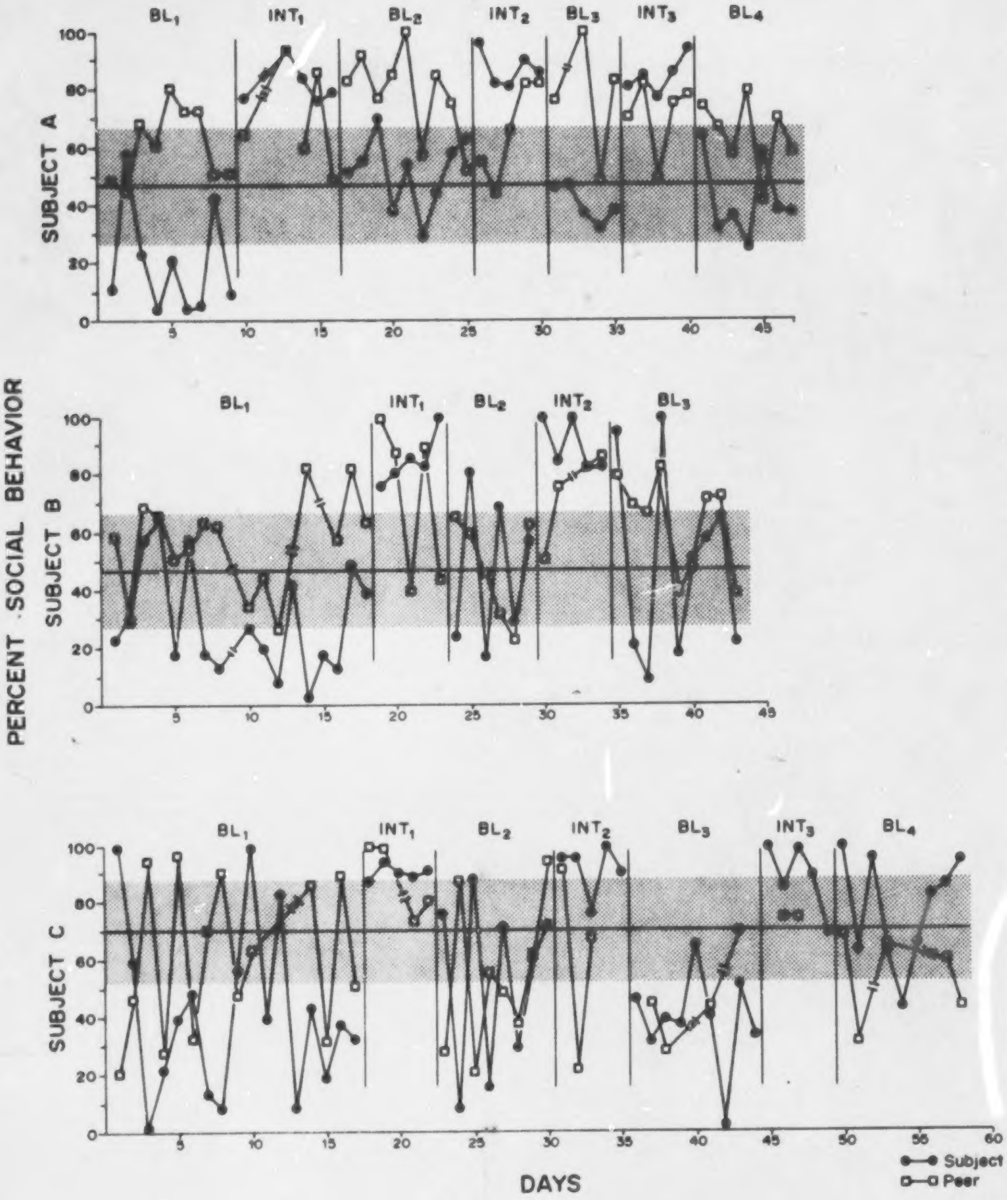

Figure 1. Percent social behavior for subjects in Experiment I

of social behavior during the fourth baseline period with those in the initial baseline condition. Mann-Whitney U Tests were conducted between these sets of data; and in the case of all three subjects, social behavior levels in Baseline 4 were significantly higher than those in Baseline 1 -- $\underline{U}$ (7,9) = 11.0, $p < .025$ for Subject A; $\underline{U}$ (9,9) = 20.5, $p < .05$ for Subject B; and $\underline{U}$ (8,17) = 22.5, $p < .01$ for Subject C -- see Table 3. An examination of phase means from Baseline I to Baseline 4 shows increases from 19.67 to 41.43% for Subject A, from 29.98 to 48.89% for Subject B, and From 42.35 to 77.67% for Subject C. By the end of the study, all subjects made up a considerable portion of the initial discrepency between their peer involvement levels and those of their classmates, moved within the normal ranges of social behavior defined by their respective grade norms, and showed a statistically significant increase in peer relations over initial baseline levels.

The individual findings, outlined above, generally are supported by group data as well. Figure 2 contrasts subjects' and peers' average levels of social behavior by phases for all three experiments. It is clear that subject social behavior in Experiment I, initially well below the peer level, was moved beyond the peer level with each introduction of the tutoring and point contingency. Most importantly for the present study, their involvement with classmates was maintained at the peer level by the fourth baseline condition.

Percent Verbal Behavior

The verbal behavior of the three subjects in Experiment I is

TABLE 3

Mann-Whitney U Tests between BL1 and BL4 for Maintaining Subjects

Subject	n1	n2	U	p
A	7	9	11.0	.025
B	9	9	20.5	.05*
C	8	17	22.5	.01
G	6	16	22.0	.05
J	9	11	24.0	.05

*This subject had two initial baseline phases totaling 17 days. This period was comprised of two segments, nine and eight days in length respectively, separated by a time lag. The U value reported here was obtained by comparing the second of these segments (that which most immediately preceded intervention) with the final baseline period. A comparison of the entire 17-day period with the final baseline phase yields a p value of approximately .06.

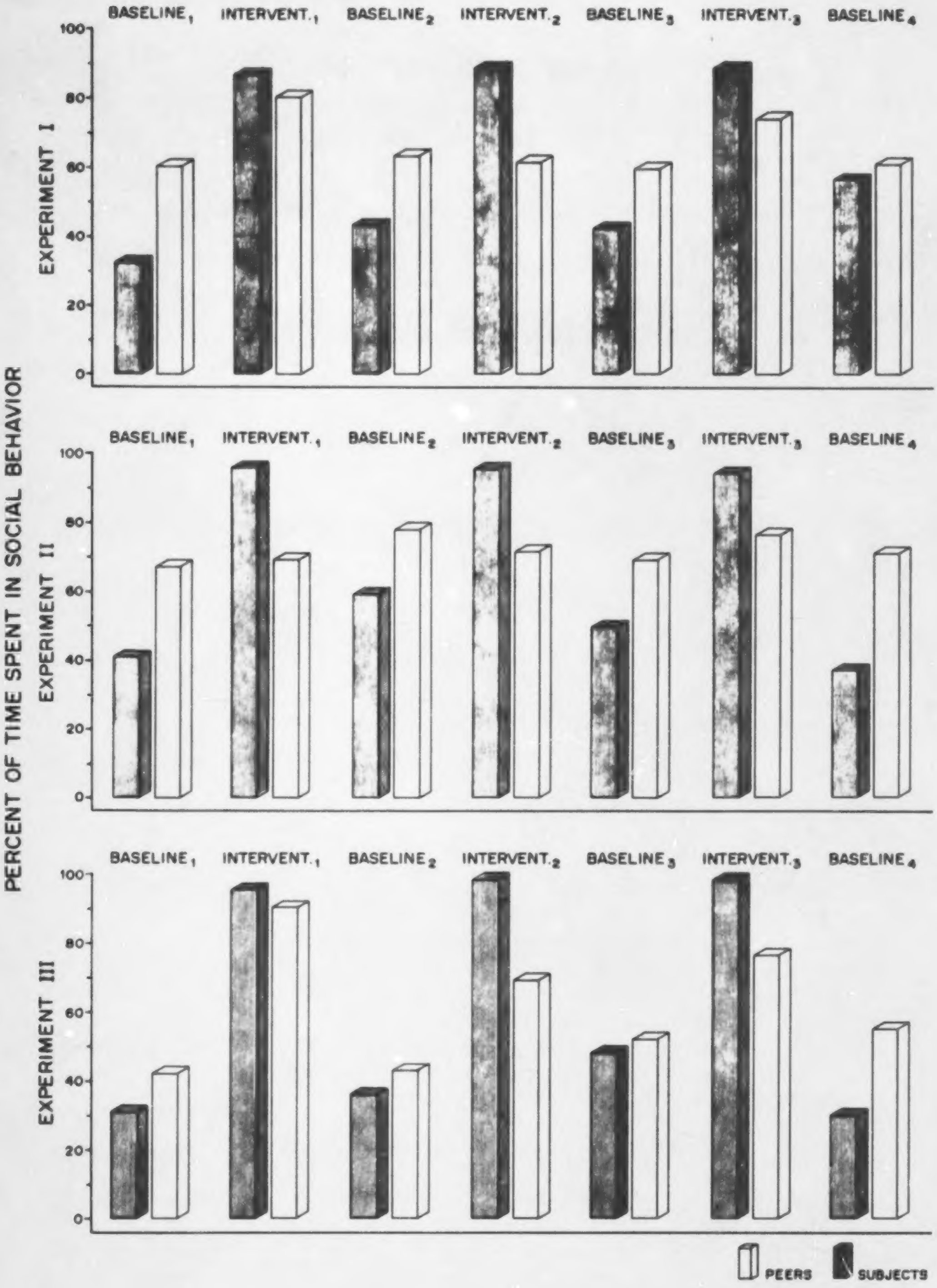

Figure 2. Percent social behavior for groups of subjects in Experiments I, II, and III

presented graphically in Figure 3. Similar to the graphs for social behavior, shaded areas represent the normative range of verbal behavior. Unlike social behavior, however, norms do not differ between grades for verbal behavior. Thus, verbal norms are the same for all subjects.

All three subjects showed initial levels of verbal behavior which were approximately one standard deviation below normative mean levels. The introduction of the intervention package produced no clear and consistant effects on subjects' verbal behavior. Verbal levels were moderately to highly variable for all subjects in all baseline periods and only slightly less so during intervention phases. The verbal behavior of Subjects A and C was higher during the final period than during the initial baseline phase, moving within the normative range, but there is no clear indication that this effect was due to the repeated exposure to treatment proceduees.

Social Validation

Peer Sociometrics

The peer picture sociometric data are presented in Table 4. Subject data represent the number of times the child was nominated by his/her peers, divided by the number of opportunities for nomination. Peer data represent the average of these percentages for the child's classmates.

Question 1 of the sociometric procedure asked children about their playmate preferences in free-play situations at school and was most representative of the situation in which intervention was conducted.

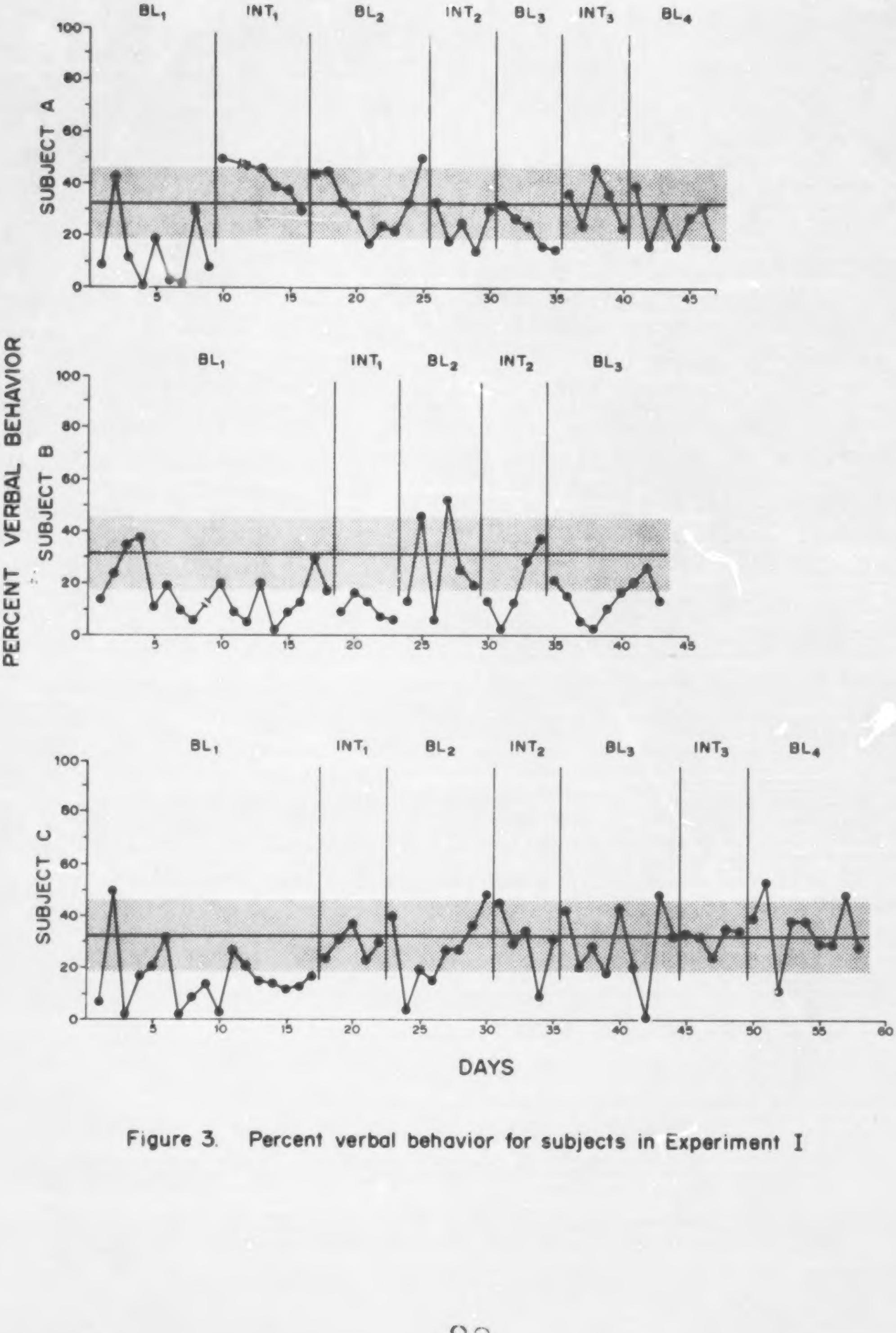

Figure 3. Percent verbal behavior for subjects in Experiment I

TABLE 4

Peer Sociometric Ratings (%)*

		Question I[a]				Question 2[b]				Question 3[c]			
		Subj		Peers		Subj		Peers		Subj		Peers	
	Subject	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Experiment I	A	33.33	53.84	62.50	61.54	33.33	23.08	58.33	63.08	8.33	15.38	56.25	67.69
	B	50.00	29.41	40.00	38.24	38.89	35.29	37.78	38.24	38.89	23.53	37.78	38.24
	C	0	42.86	42.50	40.95	0	57.14	35.83	39.05	0	42.86	34.17	40.00
	Grp. I	27.78	42.04	48.33	46.91	24.07	38.50	43.98	46.79	15.74	27.26	42.73	48.64
Experiment II	D	21.43	43.75	61.43	52.08	21.43	43.75	54.29	56.25	21.43	50.00	52.86	51.04
	E	20.00	50.00	60.00	57.14	13.33	42.86	64.44	64.29	13.33	42.86	53.33	61.90
	F	28.57	46.15	58.93	64.10	42.86	46.15	48.21	56.41	21.43	38.46	60.71	51.28
	G	6.25	53.33	34.38	46.67	12.50	26.67	32.81	43.33	12.50	40.00	35.94	40.00
	Grp. II	19.06	48.31	53.68	55.00	22.53	39.86	49.94	55.07	17.17	42.83	50.71	51.06
Experiment III	H	17.65	25.00	17.65	31.25	29.41	43.75	31.76	31.25	17.65	50.00	28.24	32.81
	J	72.73	100.00	34.09	30.00	63.64	60.00	45.45	45.00	100.00	60.00	40.91	45.00
	Grp. III	45.19	62.50	25.87	30.62	46.52	51.88	38.60	38.12	58.82	55.00	34.58	38.90

*Percent of opportunities on which the individual was nominated by his/her peers

[a] "I'm going to make you the captain of a team and I want you to pick six people to be on your team with you. Point to their pictures."

[b] "Your teacher has said that you can pick six people to work on a project with you. Point to their pictures."

[c] "You get to pick six people to come and play with you away from school. Point to their pictures."

Subjects A and C showed substantial increases between pre- and post-experimental ratings in the percent of opportunities on which they were identified by peers as favored playmates. Both children initially were rated as considerably less accepted than their peers. By the end of the project, both had achieved increased status with their peers, approaching or matching peer rating levels. Subject B showed an unexplained slight decline in peer acceptance between ratings, moving from just above to just below his peer level.

Question 3 was also a play-related question, dealing with children's playmate preferences in their home and neighborhood settings. The results of children's responses to this question parallel those of question 1.

Question 2 asked children about their preferences for partners in an in-class work task. Only Subject C showed an increase from pre- to post-project ratings on this measure, far surpassing her peers in work status by the end of the project. Subjects A and B showed a slight decline and no change, respectively.

Considered as a whole, the group of three subjects in Experiment I showed increases in status among their peers from pre- to post-experimental ratings on all three measures. Peer data were quite stable across both rating instances and measures. Although large discrepancies between subject and peer ratings existed initially, by the end of the study subjects had eliminated much of the discrepancy or virtually matched peer status levels on all three questions.

Teacher Ratings

Table 5 contains data summarizing the ratings made by teachers on the social behavior of subjects and their peers.

According to teachers' perceptions, all three subjects in Experiment I improved in social behavior between the beginning and end of the project. This improvement is shown on both Part I and Part II of the teacher's rating scale. In contrast, the ratings on subjects' classmates showed no specific trend in Part I and a decelerating effect in Part II.

Initially, all three subjects were rated lower than their classmates on both parts of the ratings scale. By the end of the project, Subjects A, B, and C all made up at least some portion of the discrepancy between their scores and those of their peers. Although in most cases subjects did not attain peer ratings levels, the smaller gap at post-test provides some evidence that their teachers perceived improvement in their social behavior.

Parent Ratings

Data summarizing the ratings made by parents of subjects and their peers are presented in Table 6.

Two out of the three subjects in Experiment I showed increases in parental ratings from pre- to post-project occasions. The third subject showed a slight decrease. The classroom peers of these children showed similar, but somewhat smaller increases from first to second ratings.

Two out of the three subjects had pre-treatment ratings markedly

TABLE 5

Teacher Ratings on the Social Interaction Rating Scale

		Part I				Part II			
		Subjects		Peers		Subjects		Peers	
	Subj.	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Experiment I	A	-1.47	.27	1.01	1.80	-.30	.60	1.76	1.50
	B	.60	1.20	.98	1.65	1.10	1.90	1.56	1.43
	C	-2.00	-1.60	2.13	1.53	-1.80	-.20	2.07	1.87
	Grp. I	-.96	-.04	1.37	1.66	-.33	.77	1.80	1.60
Experiment II	D	-1.87	-.80	2.79	2.55	.20	1.00	2.35	2.35
	E	-2.53	-1.73	2.07	2.29	-2.40	no data	2.23	2.47
	F	-.53	.60	1.55	1.30	-1.50	.80	1.43	1.50
	G	-.73	-.20	.98	1.47	-.10	1.10	1.47	1.50
	Grp. II	-1.42	-.53	1.85	1.90	-.95	.97	1.87	1.96
Experiment III	H	-1.07	1.13	2.33	2.37	-.20	1.80	2.18	1.67
	J	1.57	1.93	2.48	2.86	1.20	1.10	2.20	2.20
	Grp. III	.25	1.53	2.40	2.62	.50	1.45	2.19	1.94

TABLE 6

Parent Ratings on the Parent Rating of Child Characteristics

	Subject	Subjects Pre	Subjects Post	Peers Pre	Peers Post
Experiment I	A	.80	2.10	1.73	2.09
	B	2.00	1.44	2.06	2.57
	C	-.90	-.10	2.17	2.70
	Group I	.63	1.15	1.99	2.45
Experiment II	D	-1.40	0	1.91	2.20
	E	-2.10	2.40	1.75	1.25
	F	.70	1.90	2.00	1.70
	G	-.60	-.30	1.82	1.77
	Group II	-.85	1.00	1.87	1.73
Experiment III	H	-.50	1.10	1.97	1.75
	J	.80	1.80	2.38	3.00
	Group III	.15	1.45	2.18	2.38

lower than those of their peers. The third subject's rating was at the peer level. By the end of the study, the ratings of Subject A matched those of her peers. Subject C's rating moved toward peer levels, though remain far short of them. The ratings of Subject B decreased slightly, moving somewhat away from those of his classroom peers.

Experiment II

Only one of the four subjects in Experiment II continued to engage in social behavior at normative levels during the final baseline period. Yet, peers, teachers, and parents all rated each of the subjects as having improved considerably. No effects on verbal behavior were noted.

Percent Social Behavior

The daily social behavior of individual subjects in Experiment II is presented graphically in Figure 4.

All four subjects in Experiment II averaged one standard deviation or more below normative levels of social behavior during initial baseline periods. Childrens' social behavior also fell below classroom peer levels on most occasions when these comparative data were available. Both subjects and peers showed considerable variability during these phases.

As in Experiment I, application of the social skills tutoring/point system intervention procedures produced increases in subject interaction levels which were immediate, substantial, and consistent across subjects and across intervention phases. Intervention also reversed

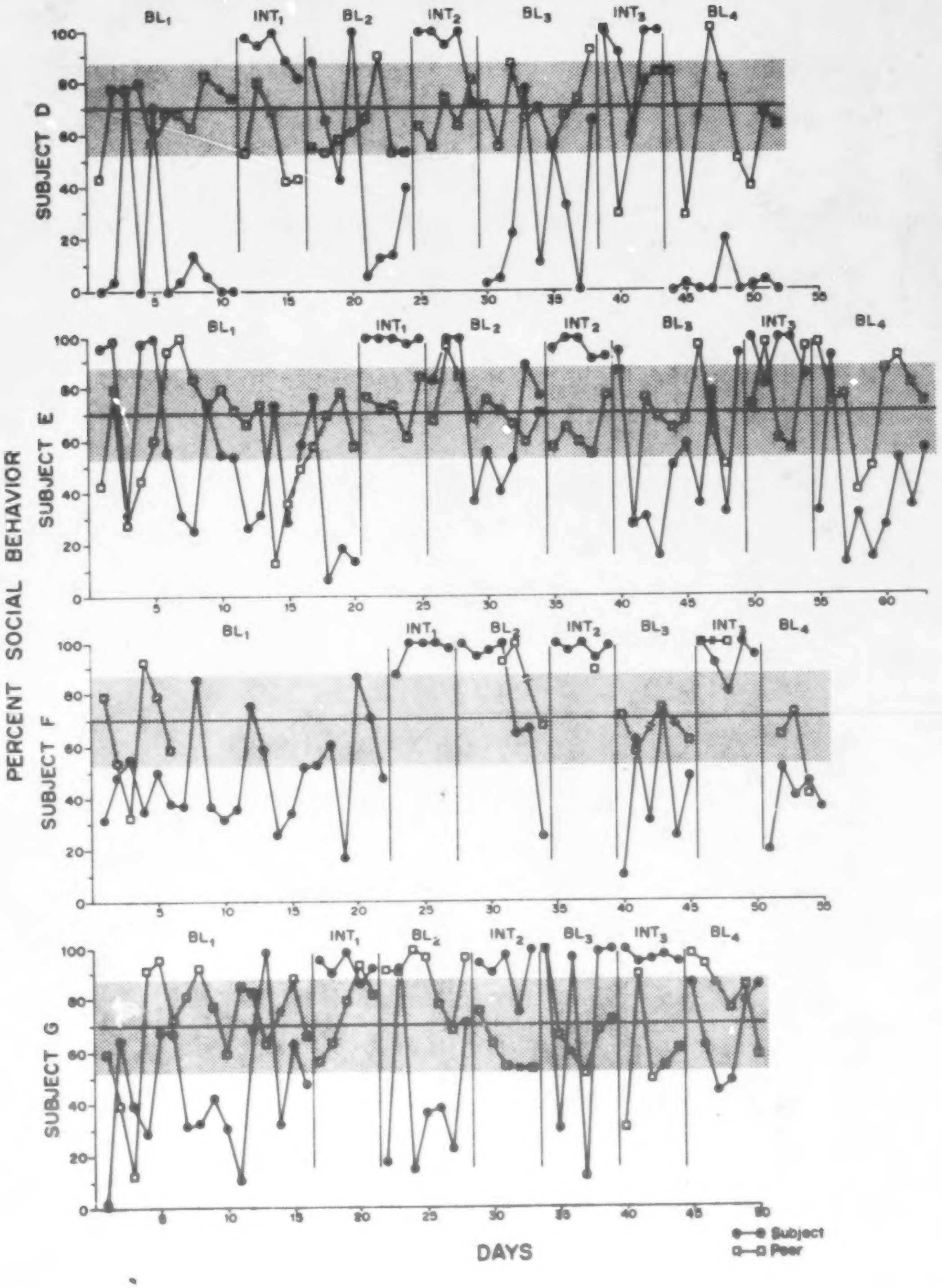

Figure 4. Percent social behavior for subjects in Experiment II

the respective levels of subject and peer interaction on most occasions and considerably reduced variability in subjects's performances.

During the second baseline period, three out of the four subjects (D,E,F) showed some maintenance above earlier baseline levels. However, their social behavior levels fell during both the subsequent baseline periods. By baseline 4, subjects' social behavior fell below their initial baseline levels. The fourth subject (G), who showed no durability of social behavior during the second baseline period, maintained higher-than-baseline peer involvement levels during the third and fourth baseline periods. By the end of the study, his social behavior maintained within the normative range of social behavior for his grade level and significantly higher than its baseline level -- $\underline{U}$ (6,16) = 22.0, $p < .05$.

Grouped data (see Figure 2) clearly show the effect of the repeated treatment paradigm on these previously untreated subjects. Social behavior, initially far below grade level, increased markedly each time that treatment procedures were implemented. These gains even persisted somewhat during the first treatment reversal period. However, the discrepancy between involvement levels during intervention and baseline periods and between subject and peer social behavior during baseline became wider with each subsequent treatment re-application and removal cycle.

Percent Verbal Behavior

The daily percentages of intervals containing verbal behavior for subjects in Experiment II are presented in Figure 5.

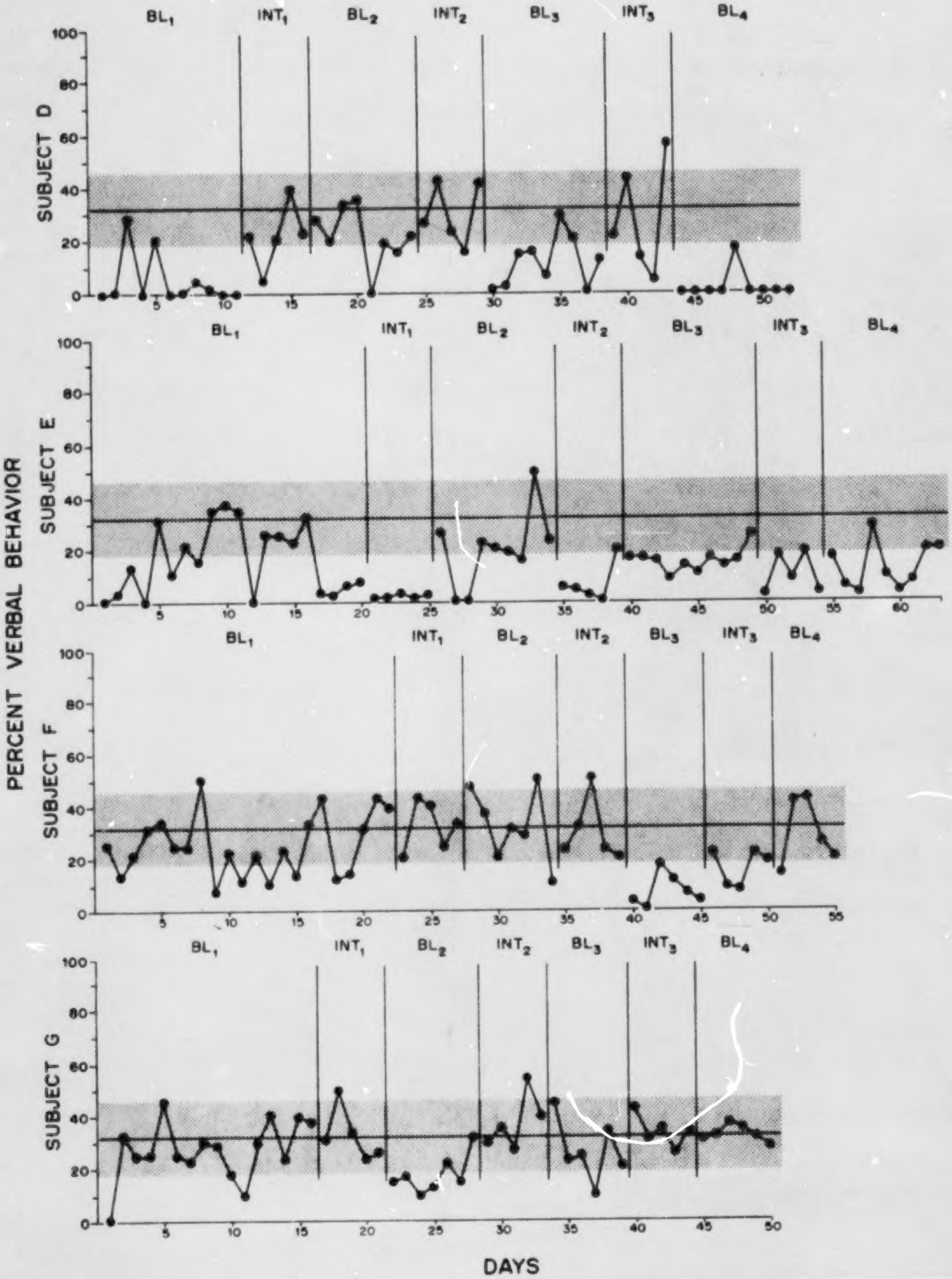

Figure 5. Percent verbal behavior for subjects in Experiment II

Only subjects D and E had verbal behavior which initially was below normative levels. The verbal behavior of subjects F and G was within the normative range during the initial baseline period. It appears that the verbal behavior of subjects in Experiment II was not under the control of the intervention procedures. At least, no relationship was found between the onset of treatment and verbal behavior across subjects.

Social Validation

Peer Sociometrics

On question 1, which dealt with children's playmate preferences in a free-play situation, all four subjects initially were rated far below their peers (see Table 4). By the end of the study, all made large gains, in most cases approaching and in one case surpassing ratings received by peers.

Question 2, dealing with partner preferences in an in-class joint work situation, produced similar changes across ratings. Initially rated less often as preferred partners than were their classmates, all four subjects made substantial gains. Three of them began to close the subject-peer gap. Subject F, whose initial rating nearly equalled that of his peers, fell slightly further behind his classmates due to an increase in the peer level.

On question 3, which asked children to state their playmate preferences for an out-of-school situation, all four subjects moved from initial ratings well below those of their peers to post ratings which approached, and in two cases, equalled those of their classmates.

Considered together, the subjects in Experiment II showed increased status among their peers from pre- to post-treatment ratings across all three questions. Corresponding peer ratings remained essentially unchanged during this same period. By the study's end, children who initially occupied low status positions within their classes moved to near-peer levels on each of the measures.

Teacher Ratings

Teachers rated all subjects as improving in social behavior from the beginning to the end of the investigation. This improvement is shown in both parts of the teacher's Social Interaction Rating Scale (see Table 5). During this same time, teachers' ratings of other children in their classrooms ramained stable.

Initial large discrepancies between ratings received by subjects and by their peers were dramatically reduced, although not eliminated. All teachers rated the subjects in their classes as being far less deviant from typically interacting children at the end than they had at the onset of the study.

Parent Ratings

Parent ratings of these four subjects show a trend similar to that seen in teacher rating data (see Table 6). Initially, all subjects in Experiment II were rated by their parents as being low interacting children in contrast to the moderately to highly interactive ratings by parents of their peers. All subjects showed improvement in parent ratings from pre- to post-experimental assessments, whereas the ratings received by their classmates remained essentially unchanged. Two of the four subjects in Experiment II made considerable progress toward the rating levels of their peers. The two remaining children surpassed peer rating levels by the end of the study.

Experiment III

The results of Experiment III are mixed -- one of the two subjects continued peer involvement during the final baseline phase, whereas the other did not. Both showed improvement in peer, teacher, and parent ratings. Verbal behavior data showed no clear effects.

Percent Social Behavior

Graphic data representing the individual performances of the two subjects in Experiment III are presented in Figure 6.

Initial baseline performance for both subjects was highly variable, but generally at lower levels than those of their classmates. The mean levels were approximately one standard deviation below grade norms.

Introduction of intervention procedures brought about large and rapid changes in social behavior levels, considerable reductions in variability for both children, and in most instances, reversed the involvement levels of subjects and peers. These changes were noted each time that treatment conditions were applied.

During the second baseline condition, Subject J's social behavior continued above its initial baseline level, averaging near his grade norm. Subject H, however, reverted to a degree of peer involvement which averaged below the normative range for her grade. By the fourth

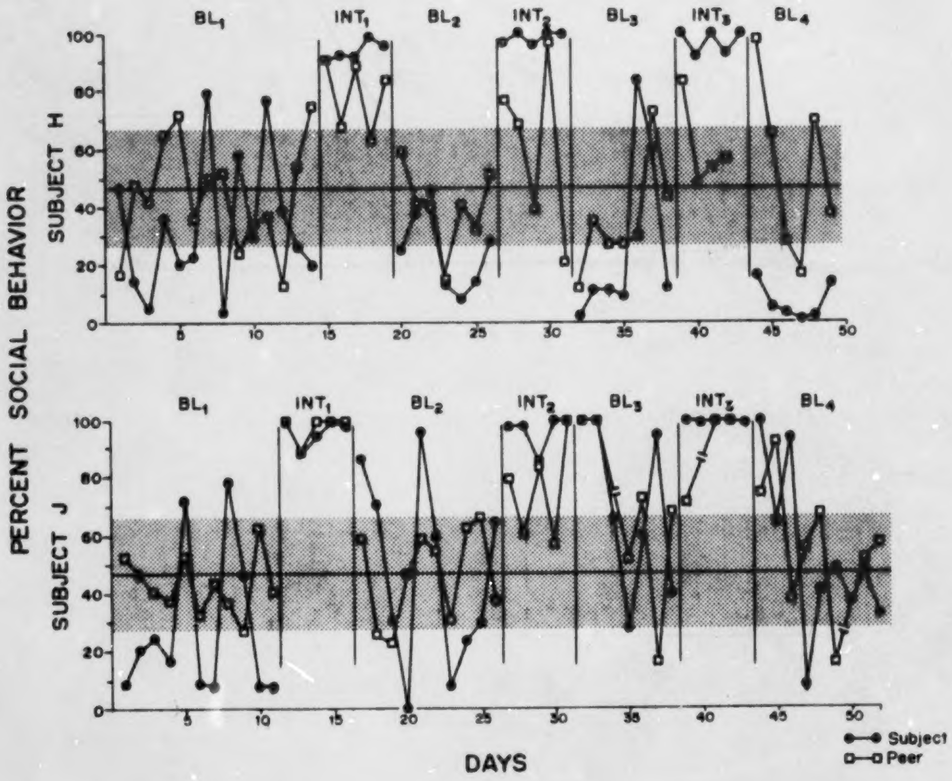

Figure 6. Percent social behavior for subjects in Experiment III

baseline period, Subject H, despite having responded well to the intervention procedures when they were in effect, dropped to a level of social behavior which was even lower than her baseline performance. Subject J, however, continued to show increased social behavior levels, finishing the final phase with a level which significantly exceeded his initial baseline level of social behavior -- $\underline{U}$ (9,11) = 24.0, $p < .05$.

Group data for the subjects across baseline periods showed increasing performance until the final phase in which the exceedingly low level of Subject H brought the group average down below peer levels.

Percent Verbal Behavior

The verbal behavior of Experiment III subjects is presented graphically in Figure 7.

During the initial baseline period, both subjects engaged in verbal behavior much less often than did children in the normative sample, falling about one standard deviation below the normative mean. Both children showed slight increases in verbal behavior when intervention procedures were introduced and slight decreases when the procedures were removed. This pattern continued across phases until the final reversal period; Subject H showed a relatively large drop in verbal behavior to near zero levels, whereas Subject J maintained a verbal level equivalent to the immediately preceding intervention phase, but barely within the normative range.

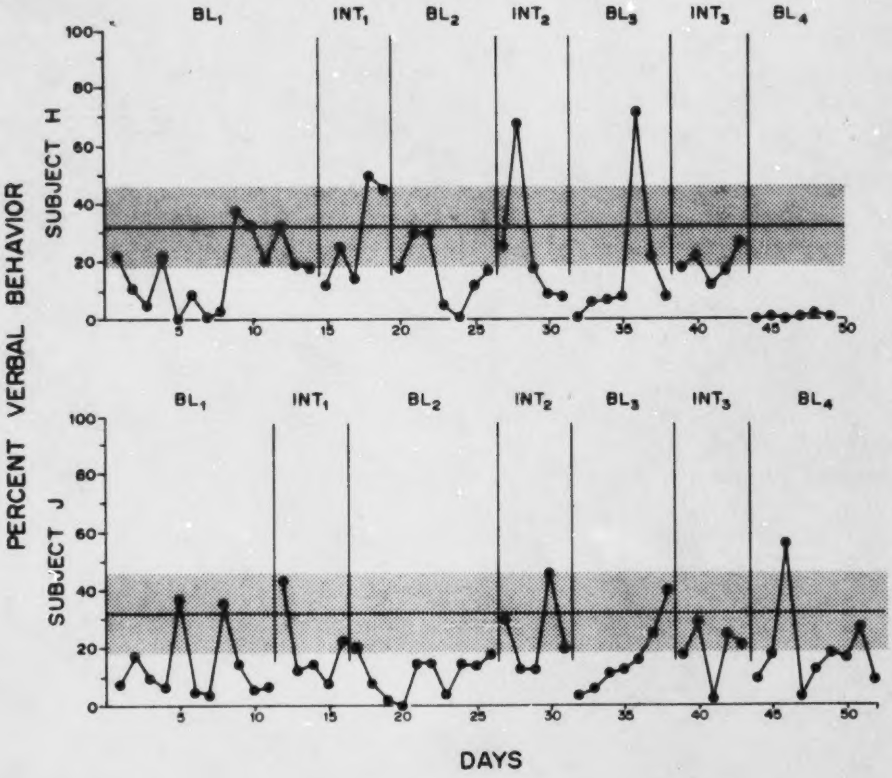

Figure 7. Percent verbal behavior for subjects in Experiment III

Social Validation

Peer Sociometrics

Both subjects made gains in peer ratings on question 1 (free-play setting), while classmates of Subject H showed a modest gain and those of Subject J showed a slight decline (see Table 4). At the pre-test, Subject H was rated by her classmates as a favored playmate as often as were other children in the class. Because her gain from pre-test to post-test was slightly smaller than that made by her peers, however, a modest discrepancy between her status and that of her peers was shown by the study's end. Subject H, on the other hand, occupied a markedly higher playmate status than his classmates at the beginning of the project, then increased his status over theirs following the intervention.

On question 2, dealing with classroom work situations, Subject H moved from a slight deficit to a slight advantage in workmate status, while Subject J maintained the higher status he held at the beginning of the project. The results for question 3 were similar.

Grouped sociometric scores, heavily influenced by the very high ratings received by Subject J, showed the children either increased or maintained their status advantages over their classmates between pre- and post-test assessments on all three measures. Peer scores, in contrast, either remained the same or increased only slightly.

Teacher Ratings

Both subjects showed noticeable increases in teacher ratings from pre- to post-test assessment on Part I of the teacher's rating scale; on Part II, Subject J showed a similar increase while Subject H dropped slightly (see Table 5). The classmates of Subject H showed an increase in teacher ratings on Part I only. Classmates of Subject J showed no change or small decreases. Thus, Subject H made no gain in teacher rating when compared to her peers, whereas Subject J made considerable gains over his peers on both Parts I and II of the teacher rating scale. When teacher ratings for the two children are considered together and compared to their classmates, subject ratings approached those received by their peers following intervention.

Parent Ratings

Both subjects showed increases in parent ratings between first and second ratings (see Table 6), while only Subject J's peers made a small increase. Thus, both subjects made gains in parent ratings over their peers on this measure.

DISCUSSION

Intervention and Maintenance Effects

Data collected on children's overall level of social behavior show that the intervention package consisting of social skills tutoring and a recess-based point system produced immediate and substantial increases in peer interaction for all subjects each time that the package was introduced. These data provide further evidence to support the findings of previous studies (Hops, Walker, and Greenwood, in press; Hops, Guild, Fleischman, and Paine, Note 17; Hops, Paine, Fleischman, and Guild, Note 18) concerning the effectiveness of PEERS Program intervention components for increasing the interactive behavior of socially withdrawn children. Of primary importance in this study, however, are the effects of repeated applications of the treatment package on subjects' social behavior in subsequent baseline phases. From the results obtained, it appears possible that intervention "booster shots" can facilitate maintenance of interactive behavior for previously treated socially withdrawn children. This conclusion is based on the finding that following implementation of the repeated treatment strategy, four of the five previously treated subjects showed a maintenance effect within the normative range for their respective grade levels, whereas only one of the four previously untreated subjects did so. Although these results are not unequivocal, they do exceed interaction levels which would have been predicted from respective baseline levels of subjects' social behavior.

Possible Explanations of Obtained Maintenance Effects

Social Entrapment

One explanation for the maintenance effects which were obtained in this study is Baer and Wolf's (1970) entrapment hypothesis. Breifly restated, the entrapment notion suggests that if the interactive behavior of socially uninvolved children can be increased, thereby allowing them to participate in on-going peer group activities, such interaction possibly can be maintained by the naturally occurring reinforcers controlled by the peers, even following discontinuation of a structured intervention. Although the notion of entrapment is an intriguing possibility and was first offered almost ten years ago, only one study involving only one subject had been offered in support of the hypothesis prior to the present research.

The strategy which Baer and Wolf used to achieve the entrapment effect was an intervention consisting of priming and reinforcement procedures embedded within a repeated treatment (reversal) design. The repeated treatment design with multiple subjects is well-suited for studying the entrapment phenomenon, since it requires alternating periods of treatment and non-treatment conditions. With this design, if subject interactions show increasing resistance to extinction with each subsequent introduction and removal of the intervention procedures, evidence accrues to support the entrapment hypothesis. Because of its suitability for investigating entrapment, and in an effort to investigate further the entrapment hypothesis, the reversal design was used in the present study with the social skills tutoring/recess point system as the repeated treatment.

The maintenance effects achieved in the present project with four of the five previously treated children and one of the four previously untreated children can be interpreted as providing further evidence to support the concept of social entrapment. That is, it is possible that the continued interaction of these children during treatment reversal periods came under the control of naturally occurring reinforcers exerted by their respective peer groups.

Intermittent Scheduling

Basic research literature in the area of operant psychology contains much discussion of the effects on behavior of various schedules of reinforcement delivery. The most general distinction to be found therein is between continuous and intermittent shedules -- that resistance of behavior to extinction is greater following intermittent reinforcement than it is after continuous delivery. The obvious implication for investigations of maintenance in applied settings is that interventions which schedule reinforcement delivery on an intermittent basis are more likely to produce durable effects than those which do not.

In the present study, consultant praise and points were delivered intermittently throughout all intervention phases, although back-up reinforcers were provided each day that the child met the pre-determined criterion number of points. However, what could be considered a corollary of the intermittent scheduling of reinforcers was in effect here -- the intermittent scheduling of intervention. Intervention was not scheduled continuously, but only on an on-off basis. To the extent that this practice represents an intermittent scheduling paradigm, it might be expected to produce effects which are more resistant to extinction than would continuous intervention across days. Further, it is possible that this arrangement accounts in part for the maintenance effects which were obtained here. However, it is also possible that interventions became both predictable and discriminative for the subjects, due to the repeated introduction and removal of program conditions. Predictability and discriminability run counter to good programmed maintenance strategies and might also help to account for the failure of some subjects to show persistent treatment effects.

Cognitive Integration

Since intervention in this study included a social skills tutoring component, it is possible that maintenance effects which were obtained are partially attributable to the cognitive or conceptual characteristics of that component. The tutoring procedures involved an attempt to teach children some basic concepts of appropriate social interaction (initiating, responding, continuing, cooperating, and peer praising). Support for the use of this component was drawn from the research on coaching (Oden and Asher, Note 8; Oden, Asher, and Hymel, Note 9). It was hypothesized that if the children could be taught some basic concepts through the use of the point system, they might be able to increase and maintain interaction with their peers. Effects of the social tutoring component of the intervention package used here cannot be ruled out as a contributing agent to the maintenance evidenced by some children involved in this study.

Other Explanations

Of course, explanations other than social entrapment, intermittent scheduling, and cognitive integration also can be used to explain maintenance of social responding during extinction. First, one might say that social interaction became intrinsically reinforcing for the children, but such an explanation is little more than a naive version of the entrapment hypothesis, since it would be virtually impossible to separate the intrinsically reinforcing properties of the interaction from its "social" nature. Further, one also might say that it was the game involvement or the "sport" of the social interactions which supported continued peer involvement during treatment reversal -- and this could be the case -- but again it would be impossible to separate the social contact from the game structures in children's play at these ages (6-9), and thus this explanation is not useful. Finally, one might predict that the maintenance effects achieved are only temporary, and that given a longer period of maintenance evaluation, children's social behavior eventually might fall back toward baseline levels. This is a very real possibility, the likelihood of which can only be determined by future research. If further investigation did, in fact, reveal that entrapment effects were only temporary, then additional treatment "booster shots" would have to be scheduled or some other maintenance strategy programmed in an attempt to increase the durability of social behavior following intervention.

To this point, only the maintenance effects of five of the nine subjects in this study have been discussed. The failure of the remaining four children to show durability of intervention effects requires a separate discussion and will be taken up shortly.

Social Validation

Most major discussions of the defining characteristics of behavior analysis in the past ten years (i.e., Baer, Wolf, & Risley, 1968) have identified the social or applied importance of behavior change as one of the criteria against which behavioral interventions should be evaluated. The currently emerging technology of social validation offers several approaches to assessing the importance of behaviors targetted for change and for changes actually achieved.

Normative Data

As one approach to social validation, Walker & Hops (1976) and Kazdin (1977) have recommended the practice of comparing a child's performance during or subsequent to intervention with the performance of non-referred/non-treated peers on the same measure.

In the present study, data collected on the withdrawn children's peers in the recess setting serves as a standard against which to evaluate the social or applied importance of the behavior changes which have been produced with the subjects through intervention. The subjects who evidenced continued interaction during treatment reversal phases maintained their levels of social responding within the normal range of social behavior for their respective grade levels. That the maintaining children were interacting within normal ranges of social behavior by the final reversal phase, compared to interaction levels which fell substantially below those of their peers at the beginning of the project, speaks for the applied importance of these results.

Behavior Ratings

Kazdin also has recommended a second approach to social validation -- verifying the importance of achieved behavior changes through ratings made on subjects' social behavior by significant persons in their natural environments. In the present study, subjects' peers, teachers, and parents completed rating procedures reflecting their perceptions of changes in subjects' social behavior prior and subsequent to intervention. In general, the subjects in all three experiments were nominated more often by their peers as preferred playmates and were rated more highly by their teachers and by their parents as socially competent children at the end of the study than they were at the beginning. Further, these post-project nomination and rating levels approached those attained by subjects' non-withdrawn peers. These gains corroborate increases in actual social behavior shown during intervention and reversal periods for maintaining subjects, but reflect actual behavior changes only in intervention for non-maintaining subjects. This outcome was achieved even though nominations and ratings were conducted only during the initial baseline and final reversal phases. It is tempting to conclude that rating agents were able to perceive actual behavior change during final baseline periods for all subjects, but such changes for non-maintaining subjects simply were not present. Although this validation of behavior change for maintaining subjects is important, the apparent perception of change for non-maintaining subjects when change was not present is somewhat problematic.

On the surface, the ratings validation procedures used here have served their purpose -- that of checking subjects' behavior change as perceived by significant others in their respective natural environments, and less directly, determining whether these persons were satisfied with the outcomes achieved. In general, it appears that the peers, teachers, and parents of non-maintaining subjects perceived the same improvement and expressed the same degree of satisfaction as did those of subjects who continued to interact during reversal periods. Thus, it appears that raters either could not discriminate between intervention and reversal conditions -- in which case more sensitive rating procedures or greater delays between the end of intervention and the completion of the final rating are needed -- or that they were responding merely to the demand characteristics of the rating situation -- that since the target child was involved in an intervention project, s/he must be improved (a Hawthorne effect). Because of this latter possibility, the results of the rating procedures used here, as elsewhere, must necessarily be interpreted with caution and conservatism, and more exacting ratings validating procedures must be sought. Only when both observational and rating data agree that someone has improved as a result of intervention will we have achieved optimal intervention and evaluation strategies (see Schnelle, 1974).

Non-maintenance Effects

The children who failed to achieve peer interaction levels by the third reversal phase appeared to show discrimination, rather than generalization, effects across time. Although all children gained entry into their peer groups during the time that the intervention procedures were in effect, these children, primarily the previously untreated subjects, failed to respond to the natural community of reinforcers available for social behavior when treatment was terminated. Several possible circumstances can be used to explain this outcome.

Age x Treatment Interaction

First, the data presented above suggest the possibility of an age x treatment interaction. That is, it is possible that both age and grade are variables contributing to obtained maintenance in this repeated treatment strategy. If younger children are less likely to discriminate treatment from non-treatment conditions, as is possible, then perhaps they are more likely to benefit from treatment "booster shots" than are older children who might quickly form that discrimination on the basis of the "on-again off-again" nature of the programming strategy. The subject in the Baer and Wolf study who became socially "trapped" was a pre-school child; the maintaining subjects in the present study were three first graders, a third grader, and a fourth grader. The non-maintaining subjects were two fourth graders, a third grader, and a first grader. Although these results contain exceptions to the age x treatment interaction notion (two older children maintained; one younger child did not), the possibility is an interesting one which could be addressed in future research.

Time-in-Treatment

General differences in performance in reversal phases between previously treated and previously untreated subjects also could be explained by a "time-in-treatment" hypothesis. Previously treated subjects had received from 20 to 40 days of intervention to increase their interaction levels with peers prior to the beginning of this project. Previously untreated subjects had no prior history of treatment for social withdrawal. It is possible that a previous treatment history, involving considerable structured practice in peer interactions is a prerequisite to benefitting from the repeated treatment maintenance strategy used in this project. Future research could help to resolve this issue.

Satiation and Restrictivity

In further attempting to explain the non-maintenance effects obtained with some of the subjects in the present study, it is possible that these children and their peers became satiated on the reinforcers that each had to offer the other, so that when the structure of the intervention was removed, naturally occurring reinforcers were of insufficient strength to maintain social behavior toward one another. This possibility suggests that a more intensive effort should be made to enhance the reinforcing properties of peer group members through alternative peer pairing and/or structured interaction procedures. Also, it is possible that the intervention brought these subjects and their peers together in too narrow a range of social activities and that they satiated on these "intervention activities", so that during reversal phases, peers chose to engage in activities which had not been a part of the intervention, and which subjects possibly did not know how to play, or at least in which they did not know how to become involved. This possibility suggests that subjects should be taught a wide variety of recess activities in an attempt to give them and their peers as much common ground for interaction as possible. Additionally, it is possible that these subjects relied too heavily on the structure of the intervention to engage in interaction and did not know how to interact independently when treatment procedures were terminated. In future research attempts to deal with this problem, repeated treatment procedures could be gradually removed or faded out to reduce discriminability in the transition from treatment to non-treatment conditions, and/or more attention could be focused on teaching subjects to initiate interactions independently and to continue ongoing interactions. Finally, in a study such as this, many subtle process variables operate to influence the obtained outcome. It is possible that the children who failed to maintain, the teachers or consultants involved interacted with the child in such a way (such as treated him/her too specially or gave him/her an undue amount of attention or consideration) as to alienate the child's peers or to suppress their probability of interacting with him / her. If such a situation is operative when attempting to increase the interactive behavior of socially withdrawn children, these variables would have to be identified and controlled in order to increase the likelihood that all children would be able to benefit from the intervention.

Rigid Control, Over-Justification, and Behavioral Contrast

The failure to show durability of peer interactions on the part of the non-maintaining subjects also could be explained by the notions of rigid experimental control, over-justification, or behavioral contrast. Under rigid experimental control, one would predict repeated increases and decreases in social behavior concurrent with the introduction and removal of the intervention procedures -- an effect which is useful for demonstrating functionality of independent variables but is an obstacle to achieving maintenance of treatment effects. This effect was obtained for the four non-maintaining subjects, suggesting that they remained more responsive to the structured contingencies of the intervention than to the naturally occurring reinforcers of the peer group throughout the project. Over-justification suggests that the social environment during reversal periods may appear to the child to be an impoverished environment compared to the relatively rich environment existent during intervention phases or even to the initial baseline environment. If this was the case, one might predict that the child's social behavior during reversals would fall below its intervention levels and possibly even below its initial baseline level. This, in fact, is what happened in the present study with those non-maintaining subjects. Behavioral contrast suggests that when response levels are altered in a given direction in a specific place and time, response levels in other places or at subsequent times may change in the opposite direction. With respect to the present study, behavioral contrast suggests that the reduced levels of social interaction during reversal phases may be accounted for by the increased levels of interaction during intervention. Any of these explanations -- over-reaction to experimental procedures, over-justification, or behavioral contrast -- is plausible, but none can be advanced over the others on the basis of these results.

Family Influence

The influence of children's families on their social behavior and styles of social interaction must not be overlooked. By the time children enter school, the major portion of their contact with other persons has been with family members. Family members likely serve as strong models of social interaction style for young children. Although peers exert a strong influence on children's social behavior from a very young age, a phenomenon which increases as the child grows older, a child's style of social interaction likely is already well formed by the time s/he begins to spend as much time with peers as s/he has with family members. For this reason, the influence of family members on social interaction styles seems very strong.

If the social climate of a child's home is highly social, it is likely that the child will develop a highly interactive social style, initiating freely to those around him/her. But if the social atmosphere in which a child grows up is quiet and reserved, the child likely will develop a less interactive social style.

The implications of these presumptions for intervention with low social interactors and for maintenance of intervention effects are fairly straight-forward. Although it appears to be quite possible to increase the interaction levels of socially withdrawn children with powerful interventions, the child's social behavior seems likely to revert to previous low levels if the style of social interaction modelled and encouraged at home is a low-key, more passive approach. Further, it is likely that many parents make it very clear to their children when starting school that one should not talk out of turn and not do anything which has not been instructed by the teacher. Following these rules to their extremes, as some children are likely to do, the child is left with little behavior at school, save that which is teacher-directed. If the child does not distinguish between the teacher-directed and self-initiated demand characteristics of the classroom and the playground respectively, s/he is likely to be passive and non-interactive, both prior and subsequent to any attempts to increase his/her interaction level.

A Cognitive/Constructs Approach

An alternative conceptualization for dealing with the notion of a durable interactive style is offered by a theory of personal constructs (Kelly, 1955). Basically, Kelly states that what a person chooses to do in a given situation is influenced by his/her perception of what the outcome of that situation will be. The basic theory is supported by several secondary principles, including the notions that: (1) perception of outcome is influenced by past outcomes in other situations; and (2) confirmation of expected outcomes influences the anticipatory process.

The constructional system offered by Kelly has applicability to understanding socially withdrawn children, their responsiveness to intervention, and their likelihood of showing continued increased interaction following intervention. In potentially social situations, a child child characterized as withdrawn most likely chooses to interact very little, possibly anticipating an uncomfortable outcome if s/he does. The child's perceptions of interaction outcomes appear to change when intervention is initiated, but the issue raised by such intervention is whether the child is reacting to positive outcomes experienced through recent interactions with his/her peers or to the somewhat contrived outcomes (rewards) offered through the intervention. Children who learn to experience the potential positive outcomes of peer interaction would seem likely to show maintenance of treatment effects. Those who respond only to the devised outcomes produced by the contingency most likely will not maintain. This interpretation has implications for the natural versus artificial nature of deliberate intervention with children's social behavior.

It is possible that an approach to achieving maintenance more fruitful than focusing simply on children's behavior change would be additionally to emphasize change in their self-perception. Such an approach, involving intervention with both cognitive and behavioral components could have much to offer the social development of young children.

Exceptions to the Treated-Untreated Distinction

The cases of the two children whose performance during reversal provide exceptions to the results expected from the treated-untreated distinction deserve special discussion. It is unclear which of the various possibilities posited above offers the best explanation for the failure of Subject H to show continued interaction during treatment reversal phases. She was young and had been treated previously. Clinical observations revealed only that she had a relatively narrow range of friends with whom she interacted, that she made few social initiations to other children, and that she may have been one child for whom more gradual removal of intervention procedures would have been appropriate. The successful maintenance of Subject G, who was older and previously untreated also was unexpected, but is less troublesome. This child appeared to have a variety of friends during intervention and good initiation skills with which to set up interactions with them during baselines. These two cases make it apparent that we have not yet found a maintenance-related distinction which is without exception--perhaps there is none. The best that can be offered from the present research is the previously treated-untreated distinction. As the limited data currently available show, maintenance predictions based on this dichotomy carry probabilities of .75 - .80. Improvement on this distinction or introductions of other relevant variables await further research.

Verbal Behavior

That none of the children involved in this project showed substantial increases in verbal behavior during intervention phases, and therefore could not possibly evidence maintenance of verbal behavior during reversal phases, suggests that verbal behavior and overall social behavior, or "play behavior", constitute separate response classes which are not necessarily responsive to the same intervention procedures. When verbal behavior is considered sufficiently important to require attention separate from overall social behavior, consequences programmed specifically for increasing verbal responding apparently would have to be arranged as an adjunct to contingencies already operative for total social responding. This finding also has been made and further has been substantiated by Hops, Guild, Fleischman and Paine (Note 17) and by Hops, Paine, Fleischman, and Guild (Note 18).

Limitations of the Present Research

Long-Term Follow-up

The purpose of this study was to provide further data regarding the Baer and Wolf (1970) entrapment hypothesis, and that goal has been met. The type of intervention, the referral and target behaviors, and the length of maintenance evaluation in this study were the same as those in the Baer and Wolf study. The primary focus of these investigations, however, was maintenance of intervention effects for children's social behavior, but this outcome was evaluated only on a short-term basis in both studies -- during treatment reversal phases lasting from five to ten days (one to two school weeks). Because personnel and budgetary constraints precluded beginning this study until late in the school year, time constraints subsequently precluded collecting longer-term follow-up data on the social interaction levels of the children involved in the study. Such a circumstance should not be used to justify the absence of such data, however. Studies of behavioral maintenance ultimately must provide data over periods of time ranging from several months to several years. Future research must go beyond these initial studies to provide long-term evaluations of behavioral persistence following a variety of maintenance programming strategies.

Data Analysis

As discussed previously, the reversal design was particularly well-suited for use under the present investigation. What has resulted from this use is a series of individual case studies using the same independent and dependent variables. However, subject variables range considerably across children and relatively small numbers of children were involved. Thus, the grouping of children for interpretive purposes may be somewhat arbitrary, although it seems to represent the most logical distinction -- both in terms of subject variables and in terms of outcome. Further investigation of the treatment booster shot question with larger groups of subjects sharing a set of common subject characteristics certainly would be useful. In addition, it is suggested that persons conducting future research in this area consider submitting their data to t-test, analysis of variance, or time series scrutiny in order to determine the presence of significant maintenance effects for individual subjects across time.

Critical components

From the present research, it is impossible to isolate the variable(s) most critical to achieving maintenance of intervention effects under the repeated treatments paradigm, although the study was not intended to be a component analysis. One could argue that using the present intervention package, the critical variable is: (1) the social skills tutoring component, which to some extent is cognitively based, (2) the point system, which likely is the most powerful of the package components; (3) the repeated treatment, or "booster shot" format, itself, as seems to be the case from both this and the Baer and Wolf (1970) studies; or (4) accumulated time-in-treatment, as suggested by the differences in results for previously treated versus previously untreated groups. Future research could attempt to determine more clearly the usefulness of the treatment "booster shot" strategy, to distinguish it from the time-in-treatment issue, and to determine whether the treatment which is repeated within the strategy is critical to achieving maintenance.

Subject Satisfaction

Finally, limited inquiry was made in this study into subjects' levels of happiness and personal satisfaction with their interaction styles prior or subsequent to intervention. Such inquiry seems important and likely would prove interesting if pursued further.

Children's involvement in this research came about following a series of several steps: (1) referral by their teacher; (2) an initial meeting with the teacher to determine child eligibility and teacher interest in using the procedures; (3) a meeting with the child's parents to explain the program and obtain their consent; and (4) a meeting with the teacher and child to explain the program to the child and determine his/her interest in participating. Thus, by the time program procedures were introduced in a given classroom, teachers, parents, and their children all had expressed an interest in participating. Additionally, teachers and parents completed forms both before and after intervention which allowed them to rate the child's social behavior with other children.

It is clear that subjects spent a great deal more time playing with their peers during intervention than they had previously. Whether this reflects increased happiness and personal satisfaction of the children, however, is not clear. At the start of the study, it was acknowledged that perhaps some children were content with their styles of infrequent interaction. Future investigators in this area could examine more closely the issue of children's happiness and self-satisfaction prior to, during, and subsequent to attempts to increase their involvement with peers.

Suggested Areas for Future Research

The findings of the present study raise a number of potential areas for further research in the areas of maintenance of children's social responding in free play situations and use of the treatment "booster shot" strategy for facilitating such maintenance. For example, assuming for the moment that a previous history of intervention for social withdrawal is required before a child can be expected to benefit from a treatment "booster shot" strategy, how much initial time-in-treatment is required to increase the probability of maintenance across treatment reversal phases? Relatedly, how many treatment sessions or repeated treatment phases are required to bring withdrawn children up to normative levels of interaction and to facilitate their continued interaction at those levels?

Are age and grade functional variables which must be taken into account in predicting ability to benefit from a repeated treatment maintenance strategy? If so, what age and grade levels most likely separate those children able to benefit from the strategy and those unable to benefit? Further, does the strategy then have anything to offer to older children?

What are the effects of more formally attempting to program increased variety of interaction partners and activities across time?

Would placing more emphasis on subject initiation skills enhance their ability to continue interacting following the termination of treatment procedures? Could the probability of maintenance be increased by fading out the intervention procedures each time that they are removed or by using a less intensive form of the intervention procedures with each subsequent treatment repetition/re-introduction?

Finally, what are the longer term maintenance effects of the repeated treatment strategy? Can children who evidence initial maintenance of social behavior and who seemingly begin to come under the control of more naturally occurring reinforcers be expected to continue interacting over a longer period of time than was evaluated in this study? That is, can the formerly withdrawn child's social behavior be expected to maintain indefinitely simply through the naturally occurring community of reinforcers? If not, would additional brief treatment repetitions be sufficient to bring the child's interaction level back up to normative levels and then to maintain them for longer periods of time? These and other questions await future investigation into the area of repeated treatments as a strategy for facilitating the maintenance of children's social behavior.

LIST OF APPENDICES

APPENDIX I: Social Interaction Rating Scale

APPENDIX II: Parent Rating of Child Characteristics

APPENDIX I

Child's Name ____________________ Teacher ____________________

School ______________________ Counselor ______________________

Date __________________

SOCIAL INTERACTION RATING SCALE Part I

1. Physically isolates self from peers while in class. 1....2....3....4....5....6....7
2. Verbally responds to a child's initiation. 1....2....3....4....5....6....7
3. Has no friends. 1....2....3....4....5....6....7
4. Engages in long conversations (more than 30 seconds). 1....2....3....4....5....6....7
5. Talks with a peer(s) on the way to P.E., lunch, the library, recess. 1....2....3....4....5....6....7
6. Smiles at other children. 1....2....3....4....5....6....7
7. Shares laughter with classmates. 1....2....3....4....5....6....7
8. Does not engage in group activities. 1....2....3....4....5....6....7
9. Spontaneously contributes during a group discussion. 1....2....3....4....5....6....7
10. Volunteers for "show and tell". 1....2....3....4....5....6....7
11. Freely takes a leadership role. 1....2....3....4....5....6....7
12. Tries to avoid calling attention to him/herself. 1....2....3....4....5....6....7
13. Spontaneously works with a peer(s) on projects in class. 1....2....3....4....5....6....7
14. Verbally initiates to a peer(s). 1....2....3....4....5....6....7
15. Other children act as if he/she were taboo or tainted. 1....2....3....4....5....6....7

APPENDIX I (Cont'd)

Rated by ____

SOCIAL INTERACTION RATING SCALE: Part II

Instructions

If you feel that the child is very much like one end of the scale, place a check mark in the appropriate extreme column. If you feel that your child is somewhat like one or the other end of the scale, place your mark in one space from the extremes under the proper heading. If the child seems only slightly like one side as opposed to the other, mark the column two spaces in from the ends under the correct heading. If you consider both sides equally descriptive, or if the category does not apply, place your check in the middle column.

Do not spend more than a few seconds marking each scale as we are interested in your first impression. When you telephone CORBEH each day, your responses may be indicated as a number and letter (for example, 1A, 2C, 3F, etc.)

	Very much like	Somewhat like	Only slightly like	Equally descriptive or n/a	Only slightly like	Somewhat like	Very much like	
1. Happy								Depressed
2. Unsociable								Sociable
3. Interesting								Boring
4. Responsive								Aloof
5. Tense								Relaxed
6. Inactive								Active
7. Introverted								Extroverted
8. Adventurous								Timid
9. Many Friends								Friendless
10. Liked by Peers								Disliked by Peers
	A	B	C	D	E	F	G	

APPENDIX II

Child's Name ________________________ Date ________________________

Rated by ____________________________

Parent Rating of Child Characteristics

Instructions

If you feel that your child is very much like one end of the scale, place a check mark in the appropriate extreme column. If you feel that your child is somewhat like one or the other end of the scale, place your mark in one space from the extremes under the proper heading. If the child seems only slightly like one side as opposed to the other, mark the column two spaces in from the ends under the correct heading. If you consider both sides equally descriptive, or if the category does not apply, place your check in the middle column. Do not spend more than a few seconds marking each scale as we are interested in your first impression. Remember to place only one check mark on each line.

	Very much like	Somewhat like	Only slightly like	Equally descriptive or n/a	Only slightly like	Somewhat like	Very much like	
1. Happy								Depressed
2. Unsociable								Sociable
3. Interesting								Boring
4. Responsive								Aloof
5. Tense								Relaxed
6. Inactive								Active
7. Introverted								Extroverted
8. Adventurous								Timid
9. Many Friends								Friendless
10. Liked by Peers								Disliked by Peers
	A	B	C	D	E	F	G	

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